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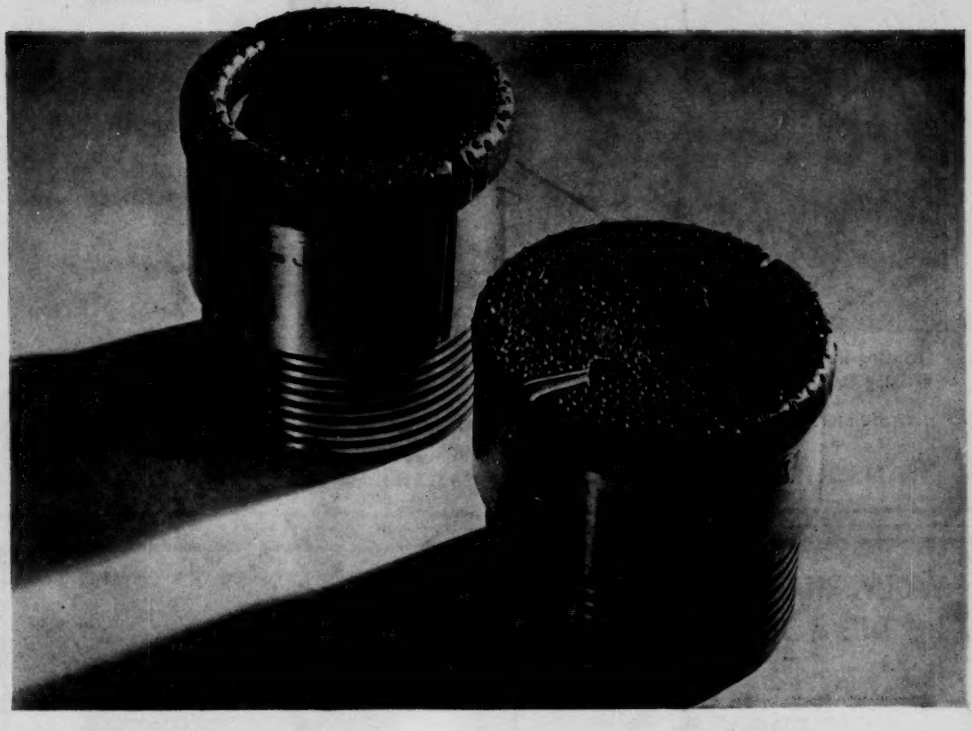

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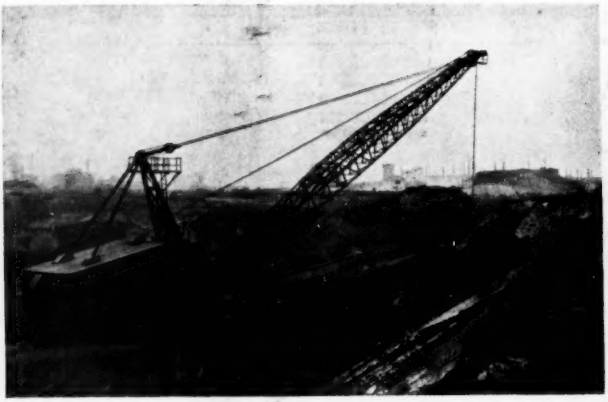

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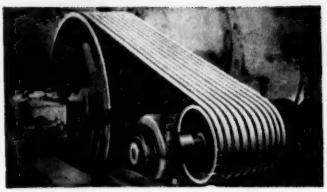

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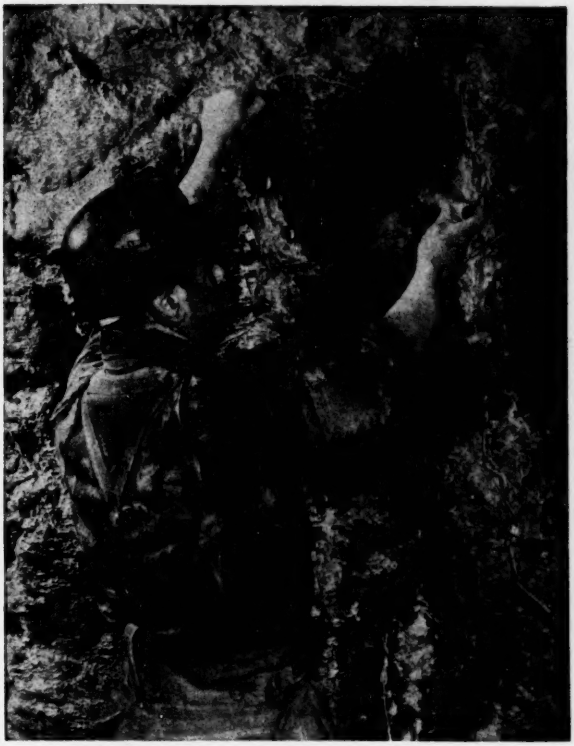

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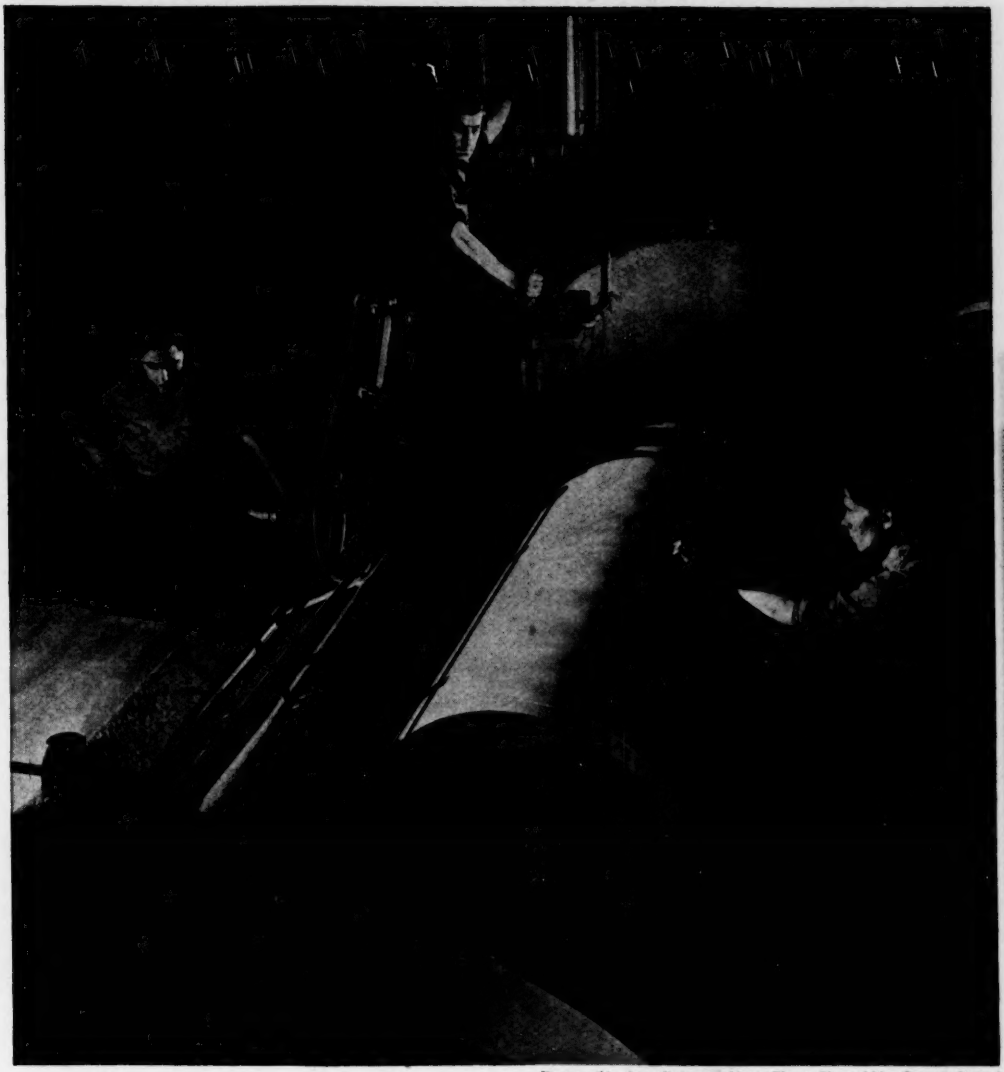

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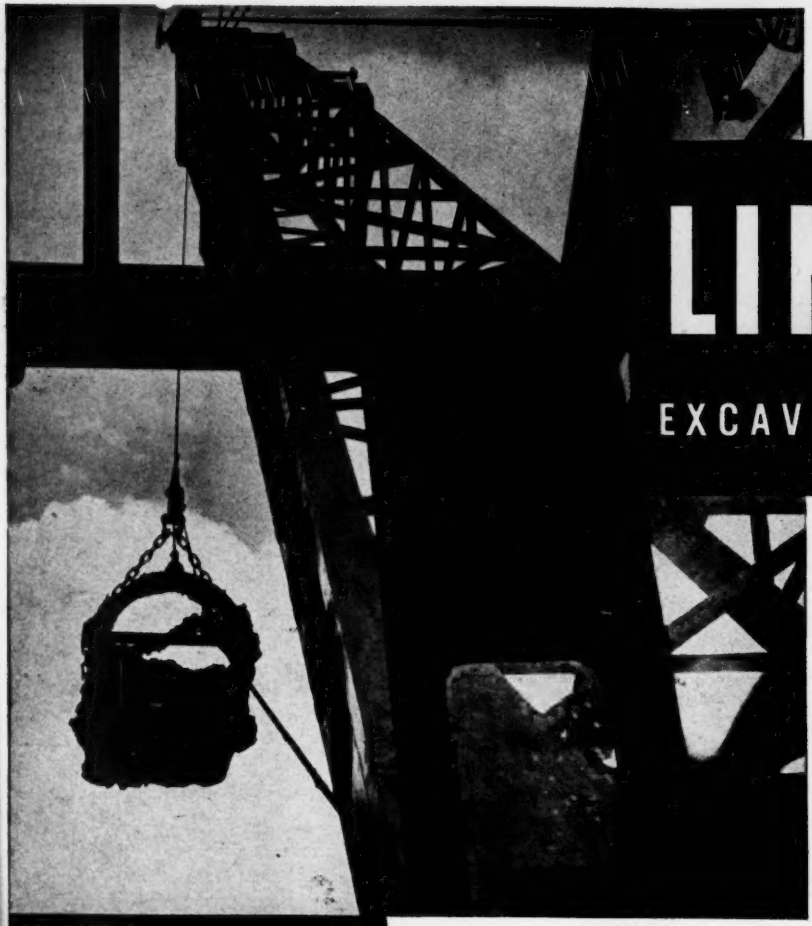

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NOTES AND COMMENTS

S.A. Budget—No Change in Gold Mines' Tax

The South African budget followed the general pattern of the budgets already presented by other sterling countries; the bank rate is being raised from 3½ per cent to 4 per cent; a maximum amount has been fixed for imports during the year, and a budget surplus has been provided for of £1,400,000.

The position of the gold mining industry is unchanged. The Finance Minister, Mr. Havenga, explained that gold-mining taxation was increased last year and in view of the increased working costs and the need to attract the large volume of capital still necessary to bring new mines to the producing stage, he thought other avenues should be explored before resorting to further increases from this source. However, the tax rate on diamond mines was increased by 1s. in the pound, from 8s. to 9s. which, he estimated, would yield some £270,000 in the financial year. The tax rate was also increased on base metal mining companies by 6d. in the pound, which would mean an increase from 5s. 6d. to 6s., and this impost, together with the increase from 4s. 6d. to 5s. in the case of industrial and commercial companies, would yield approximately £2,770,000 in a full year.

Referring to the general economic situation in South Africa, Mr. Havenga declared that the strain on the Union's balance of payments had been caused largely by the importation of machinery and other capital goods necessary to support the tremendous development which had taken place in South Africa since the end of the war. These investments, he said, were now beginning to bear fruit. Three new gold mines were already in production and a further six were expected to commence production in 1953 and thereafter, other developing mines were expected to come into production at the rate of two or three per annum. Furthermore, exports of uranium were expected to add a substantial amount to the Union's income from next year onwards and the export of other minerals was also increasing.

Broadly speaking, the budget was much as had been expected. The increased levies on diamond and base metal producers, if anything, were less than many quarters had anticipated, although some circles in the City had hoped that Mr. Havenga would scale down the gold-mining taxation formulae to the 1950 level. Indeed, in many respects it is surprising that some relief or positive incentive was not given to gold producers to increase their output. For the need to buttress the sterling areas supplies of gold has been painfully obvious for a long time.

That this was not done was probably due to his conviction that the incentive to gold producers to raise their production would come from a world-wide upward re-adjustment in the price of gold. His belief that this upward adjustment in the price of gold was bound to come, he said, had been strengthened by developments over the past six months which, he felt, made it less likely that governments would be able in the long run to peg the price of gold at a level entirely out of line with the value the public attached to it. In support of this statement he pointed out that about 9,500,000 oz. of gold had been sold on the free markets last year and the fact that such a large volume had been absorbed at more than three dollars above the official American price was striking evidence of the public's faith in gold and their distrust of paper currency.

Currently, the price of gold on the free markets is standing around $37.50/$38 and if, as Mr. Havenga anticipates, that over 13,000,000 oz. will come onto the free market in the current year, it is difficult to conceive of the free market price going much higher unless the international situation darkens considerably. This is not to discount completely Mr. Havenga's statement that the premium is indicative of the public's faith in gold and as a corollary their distrust in paper currency but it does put out of court any hope that should an upward adjustment of the gold price occur it would not be raised by more than that by which its price level is being effectively tested in the world's free market.

Will Alloy Steels be Rationed?

The idea put forward at Birmingham last week by a member of the British Iron & Steel Federation that there was a prospect of a surplus of steel before the end of the

year, has been promptly repudiated. Now it transpires that the extension of the steel rationing scheme to embrace certain types of alloy steel is imminent. It is a question of *force majeure*. Scarcity of nickel and molybdenum imposes the strictest economy in their use. Other alloying materials such as tungsten and chrome are not quite so scarce, although there is no certainty that the position may not again deteriorate. In regard to nickel and molybdenum, however, the deficiency is so serious as to demand immediate restrictive measures, and it is expected that alloy steels containing these two precious metals will be linked with carbon steel in a three-tier rationing system.

At the same time the substitution of lower specifications for the composition of alloy steels so as to effect economies in the use of alloying elements has been explored. The British Iron & Steel Federation is credited with the preparation of a table of varying heat treatment processes which will enable a more limited number of types of alloy steel to be employed for a wide variety of purposes. Thus it is expected that three or four standard types of alloy steel can be substituted for the 30 or more specifications at present in use. If this can be achieved it will be a further triumphant vindication of the costly and patient research organization which is sponsored by the B.I.S.F.

Cornish Mining Developments—Political Aspects Reviewed

The report of the executive committee of the Cornish Mining Development Association, which was submitted at the Association's annual meeting on March 25, reviews the salient points of the Association's activities during 1951-52. Broadly speaking, the report does not describe any of the Association's activities which were not previously known and which, in general, have not been commented on in these columns during the past year.

On the other hand, it does furnish some details as to what took place in the discussions between representatives of the Association and Mr. R. R. Stokes (former Minister of Materials in the Labour Government) and also of the Association's discussions with his successor, Viscount Swinton, on January 22 last, thereby helping us to keep abreast of Cornish mining developments.

It may be recalled from a note which appeared in these columns on September 14, 1951, under the heading, "Cornish Mining Industry—Now Practical Politics," that the meeting with Mr. Stokes took place at Camborne on September 10 and that the only information available to the Press at that time was "that a full and frank exchange of views took place." From the report now published it is clear that the Association put four main points before the Minister: (1) The metal shortages the country was already experiencing would, in all likelihood, eventually become still more serious; (2) The potential mineral output of Cornwall and Devon was not confined to tin; that the Western Counties could make an important contribution to the country's need of wolfram, and that it was probable that some copper, zinc, lead and pyrites could also be produced; (3) The desirability of establishing a Mineral Development Commission—as recommended by the Westwood Committee—was stressed; (4) The hampering effect of the present system of taxation was emphasized, the Association declaring that unless and until mining taxation was radically altered there was no possibility of any general revival of base metal mining in Britain.

In reply, the Minister said that he believed that the raw material problem, with especial reference to non-ferrous metals, was one that would remain with us permanently. With regard to the desirability of implementing the report of the Westwood Committee, he told the Association's representatives that the Westwood report had been pigeonholed as the result of an adverse Cabinet decision in January, 1950, but was, in consequence of his pressing recommendation, being reconsidered by the Government as a matter of serious urgency. Although taxation was a matter over which he had no direct control, he said he would make representations about it to the then Chancellor of the Exchequer, Mr. Gaitskell.

The most important feature of the conference was, the Association believed, Mr. Stokes' agreement that it was almost impossible to find new capital for a high-risk industry such as base metal mining with taxation at its present level.

However, at this juncture in the Association's attempts to follow through its negotiations Mr. Stokes was replaced by Lord Swinton, Minister in charge of the Ministry of Materials, when the Conservative Government came into power.

On January 22 of this year, the Association sent a deputation to present their case afresh to Lord Swinton. (See *The Mining Journal*, February 1, 1952, page 116). In general, the same suggestions made to Mr. Stokes were put forward for Lord Swinton's consideration, the chief difference being a shift in the emphasis rather than in the substance. In particular, the paramount importance of the necessity for drastic changes to be made in the mining taxation system was still more strongly emphasized. The Minister in his reply said that the serious state of the country's finances precluded the possibility of public funds being made available for mineral development. This comment appeared to be somewhat wide of the mark as the Association's representatives pointed out that neither the Association, nor the existing mining companies, were asking for the expenditure of public money, but for a reduction of the present prohibitive taxation which made it quite impossible to induce private enterprise to invest in a high-risk industry of this nature. In support of this statement the names of several large British mining houses who had told the Association that the present incidence of taxation was the reason why they were not currently undertaking developments in Britain, were given to the Minister. This elicited the promise that he would confer with a representative group of British mining firms about this matter.

Commenting on the recent Budget speech the executive report notes that it is proposed to give certain additional allowances to mining concerns operating abroad and although the extent of these allowances will not be known until the Finance Bill is published, the Association quite rightly hopes that sympathetic consideration will be given to the claim of the home mining industry that it should be treated at least as favourably as British mining companies operating overseas.

Other matters of interest dealt with in the report concerned the impending re-opening of the Trebartha-Lemarne tin-wolfram-arsenic mine near North Hill in East Cornwall and the Lambriggan lead-zinc mine near Perranporth. Plans for re-working these mines were made before the Budget was announced and it is the hope of the Association that the provisions of the Finance Bill will not bring these and other efforts to expand mineral production in this country to naught.

Exploratory Oil Drilling on Isle of Wight

In its continued efforts to arrest the decline in Britain's small crude oil output, the Isle of Wight is, for the first time, to be the scene of oilwell drilling operations. An exploratory well will be drilled there by the D'Arcy Exploration Co. (the Anglo-Iranian Oil Company's prospecting subsidiary) near the village of Arreton, as soon as the well now being drilled near Ainsdale-on-Sea, Lancashire, is completed.

Belgian Congo

(From Our Own Correspondent)

Brussels, March 22

In 1891, the Belgian engineer Diderrich, a member of the expedition headed by the Belgian explorer, Delcommune, sent to Katanga by the Brussels Compagnie du Katanga, discovered cassiterite in that south-eastern part of the Belgian Congo.

A dozen years later, further cassiterite discoveries were made in Southern Katanga by prospectors of the London Tanganyika Concessions Ltd., which had been entrusted with prospecting in Katanga by the Brussels Katanga Special Committee.

In 1911, Mr. Mathieu, of the Brussels Bakat, discovered cassiterite at Muika, on the Luvua, the river bringing to the Lualaba (the Upper Congo River) the waters of Lake Mwero.

The fact that cassiterite discoveries had taken place in the Lualaba Basin, induced the Liège Géomines to send thither prospectors and this resulted in the discovery, in 1911, of a cassiterite field at Manono, a village between Lualaba and the Luvua Rivers. And as the Lualaba is navigable on that part of its course, Géomines connected Manono with Muyumba by a 50 k. light railway. Muyumba is on the Lualaba, 501 k. north of Bukama, which was, then, the terminus on the Lualaba of the railway from Beira and from Capetown.

In the last 20 years, 70,000 tonnes of cassiterite were excavated from the altered pegmatite there.

But as this field is getting depleted and will be exhausted between 1957 and 1961, Mr. Henry Barzin, the Géomines managing director, some years ago put down bores under the altered ores. These resulted in the discovery of cassiterite in the hard rock underneath, and though the borings were carried out to greater depth, cassiterite was always met (in small grains). As enormous tonnages had thus been revealed when borings were stopped, at a depth of 125 metres, Géomines was assured of reserves guaranteeing production for tens and tens of years. At this depth the bottom had not been reached and the tin contents were higher than on the surface.

IMPORTANCE OF GEOMINES' DISCOVERY

Under these circumstances, Géomines is now summoning its shareholders to Brussels, on April 1st, to invite them to increase their 200,000,000 frs. capital by 500,000,000 frs., thus bringing it to 700,000,000 Belgian frs. in order to enable the company to work its discovery, which Mr. Barzin tells me is one of the biggest tin reserves the world over.

The Géomines discovery is better known across the Atlantic than on this side. As far back as 1948, Mr. Tom Marvel referred in the *New York Herald-Tribune* to *The New Congo* (Duell, Sloan and Pearce, publishers in New York) and, on March 30, 1951, the Washington National Geographic Society issued an advance report on Manono, by Mr. W. R. Moore, who was carrying out an extensive tour of the Belgian Colony. Further, from talks with Mr. Wm. E. Moran, Jnr., Field Representative for Belgium, the Belgian Congo and Ruanda-Urundi, of the Washington Defence Procurement Agency, I have learnt that the U.S.A. Government is well aware of the importance of the gratifying results of the initiative of Mr. Henry Barzin. Mr. Moran visited Manono to get acquainted with what the National Geographic Society terms "a giant block of tin-bearing rock, whose bottom has not yet been found."

Apropos Mr. Barzin; under his management, the company did wonders for its native labour. Thus, according to Tom Marvel, "the humblest native worker has a home, a garden and all that he and his family want to eat" . . . so "the fame of Manono has spread far and wide among the Congo folks" and accordingly, "there is a long waiting list of those who wish to join Manono's native community." Finally, Mr. Barzin assured me that he should work the discovery taking account of the conditions prevailing on the tin market. So the other producers, the world over, must not fear a Géomines overproduction of tin.

Portugal

(From Our Own Correspondent)

Oporto, March 14

The decree published on February 27 requiring exporters of all kinds of national goods to pay 30 per cent of the value of all merchandise to the Bank of Portugal, is viewed with grave concern by the trade. This 30 per cent which may be raised to 100 per cent in the event of the position of the trade balance deteriorating, will be refunded to exporters within a month from date of deposit, "if possible." An "Official Statement" published on the 10th inst., informs exporters that "there is no cause for alarm" and that the Commission appointed to deal with each branch of the export trade will present their report within a few days. Port wine, other wines, cork and canned fish were, presumably, exempt; but Port firms have been required to deposit 30 per cent. The assurance that no cause for alarm exists has not given rise to the rejoicing that official circles seemed to expect. U.S.A. is exempt from the clauses of this decree, in fact all the dollar area has been excluded. The victims are the European countries. It is worth noting that exports from Portugal are about one-third less than are imports, and that Europe is Portugal's chief supplier.

The countries to which wolfram concentrates were exported in December, 1951, and January of this year, together with the cumulative totals for 1951, are shown in the following table:

Wolfram Concentrates Exported	*December* (1951)	*January* (1952)	*Jan.-Dec.* (1951)
Country	*(tonnes)*	*(tonnes)*	*(tonnes)*
U.K.	300	135	2,288
U.S.A.	223	50	1,697
Germany	56	25	76
Sweden	1	Nil	74
France	Nil	35	60
Belgium	Nil	Nil	12
Italy	Nil	Nil	11
Others	Nil	Nil	5

In the following table, figures are given for other Portuguese minerals exported in December, 1951, and January of this year, together with the cumulative totals for 1951.

Materials Exported	*December* (1951) *(tonnes)*	*January* (1952) *(tonnes)*	*Jan.-Dec.* (1951) *(tonnes)*
Tin Concentrates	224	89	1,025
White Arsenic	152.5	50.8	807
Cupreous Pyrites	81,724	25,887	570,939
Manganese Oxide	1,331	600	10,536
Iron Ore (estimated)	—	—	10,000

The Gardner Hydraulic Hoist

In the following article, a review is given of a novel hoisting system designed by Percy S. Gardner, Jnr., of the Consolidated Copper Co. An experimental system is now in use at the Calumet and Hecla Mine, Shullsburg, Wis., U.S.A.

Moving ore and rock from underground to the surface in a continuous stream has been one of the more notable recent developments in mining. However, where vertical or steeply inclined shafts are used, this stream had, until now, to be broken by intermittent skip hoisting, but by means of this completely new method—described in this article—of raising ore, a continuous stream is lifted through a vertical column of water without interrupting normal hoisting for mine service and waste removal. The impact of this innovation may be very far reaching; for example, production at a mine with a 1,000 ft. shaft is to be increased from a few hundred tons to 1,000 tons per day; the available hoist is already working at full capacity and nothing short of new and larger equipment, or possibly another shaft with additional hoisting gear, will meet the situation under the new programme. On the other hand, by transferring the crusher underground, installing a hydraulic hoist in the pipe compartment, and providing the necessary underground alterations, all the ore can be hoisted hydraulically, leaving the original hoist for personnel and service duty. Thus, by choosing a 10 in. pipe, crushing to 3 in., and loading at the rate of two tons per minute, 968 tons can be hoisted per 8 hour shift.

THE HECLA AND CALUMET INSTALLATION

In this experimental installation ore is hoisted through a vertical distance of 365 ft. As shown in the diagram, the total head room for the loading chambers below the 330 ft. level is 22 ft. The hoisting column is standard 10 in. pipe installed in a shaft compartment. Five pumps delivering about 2,000 gallons per minute from various sumps in the mine feed this column. Ore is crushed underground to 4 in., loaded through the hopper and chambers, and hoisted to an overflow box 15 ft. above the shaft collar, then to a de-waterer. About half the ore is greater than 4 in., some of it is up to 8-9 in. in length. Water from the de-waterer goes to a settling pond, ore to a temporary demonstration bin. The de-waterer has a double deck (the upper of 5/8 in. screen, the lower of ¼ mm. screen). Eventually, the ore will be delivered direct to the mill bin.

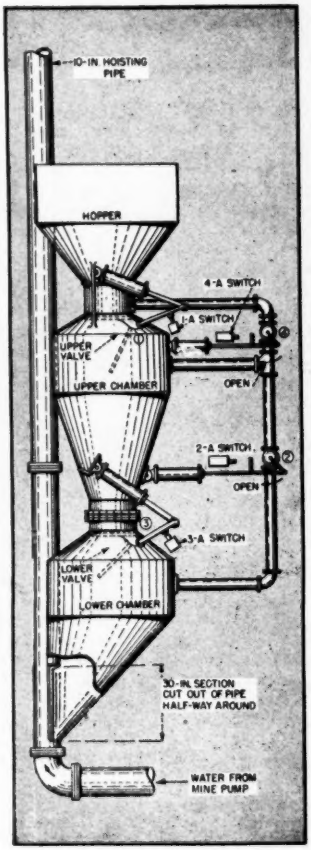


Diagram of the Gardner Hydraulic Hoist in experimental use at the Calumet and Hecla mine

Underground loading is at present carried out by hand, but eventually this will be done by a conveyor system.

The capacity for hoisting with 2,000 g.p.m. will be 120 tons per hour with 2 ton charges, and by increasing the flow to 2,500 g.p.m., it is calculated that the capacity will be increased to 240 tons per hour.

Static pressure in the chambers with the water at rest is 155 p.s.i.; while the water is in motion, pressure is 160 p.s.i., and there is no appreciable change while rock is being hoisted.

A batch of ore drops through the hopper into the upper chamber; the upper valve closes and high-pressure water from the lower chamber is by-passed to the upper chamber to equalize pressures in the two chambers. Next, the lower valve drops by gravity, permitting the ore charge to drop to the 30 in. cut away section in the 10 in. hoisting pipe (see diagram). Synchronization of the valves is achieved as follows: (1) The upper valve is open, a batch of ore drops from the hopper into the upper loading chamber; the upper valve is closed by an air cylinder. (2) As the upper valve closes, switch 1-A closes also, thus actuating a solenoid on the cylinder connected to water cock 2 and opening same. (3) At the end of the cock opening stroke, switch 2-A is actuated, this in turn causes water cock 2 to close and, at the same time, retracts the piston controlling the upper valve. The upper valve, however, remains closed because high pressure water has been admitted into the upper chamber via the opened cock 2. Switch 2-A also starts a timing device which acts on the lower valve after a pre-set interval. (4) When the pressures in upper and lower chambers are equal (step 3), the lower valve opens by gravity, the ore charge falls through the cut away section, and is carried to the surface by the flow of water, which is continuous during hoisting operations. (5) Ten seconds after the lower valve has opened, it is closed by the timing device which was triggered during step 3. (6) As the lower valve closes, switch 3-A is actuated by a projection attached to the lever; this causes water cock 4 to open through an air cylinder. Since water cock 2 is closed, this action allows pressure in the upper chamber to become atmospheric. At the end of the air cylinder stroke, the switch 4-A is actuated in turn, causing cock 4 to close, and triggering a timing device, which will close the upper valve after a pre-set interval. (7) As the pressure in the upper chamber became equal to that due to the atmosphere, the upper valve opened by gravity, a fresh ore charge was admitted and the upper valve closed due to the timing device triggered in step (6). Step (1) has now been reached again, the process restarts while ore is being hoisted.

ECONOMICS OF THE INSTALLATION

It is suggested that savings in operating costs will be found in lower peak power demands and in the absence of direct labour charges. The cost of installation is estimated at less than half that of conventional equipment for

the same duty. Maintenance, when compared with conventional systems, would be extremely low.

The system may be used as described for the Hecla installation, but where there is no mine water to be pumped to the surface, a modification may be made. Instead of a single pipe, a U-tube arrangement is installed, with the drive pumps located at the surface feeding water into the top of the down current limb: loading chambers as illustrated being fitted to the lowest portion of the up-current limb. Since the two columns are in static balance, relatively little power is required to keep water in them in motion, as compared with the single column system. Loading the water column is stated to cause very little increase in power consumption.

POTENTIALITIES

When used in a deep installation, there appears to be no reason why loading should not take place at more than one level, providing that "injections" from the second level can be synchronized to introduce ore into the "gaps" left from the first loading point.

The use of heavy-media in the "U-tube" system may have advantages, since the velocity required to lift a given particle of rock in a column of fluid decreases proportionally to increases in the fluid density; any decrease in velocity will be accompanied by a reduction in power demand.

If heavy medium is used in such a system, it may be possible to make the overflow box perform duty as a sink and float separator, and so provide a pre-concentrating facility while the ore is being transported from the stope to the mill bins. Such an arrangement might be ideal for use in coal mines and might be of particular advantage where the continuous coal cutter is used with its associated relatively smaller sized product. An obvious difficulty to be overcome would be the contamination of the medium by dust and fines. However, it appears that the mining engineer has here a new technique for hoisting that should be very closely watched, and, if proved satisfactory, may be adapted to solve many current hoisting problems.

Molybdenum Disulphide as a Lubricant

The use of graphite as a solid film lubricant has long been known, but recently a number of other solid materials have been suggested for such a use. Amongst these, molybdenum disulphide shows great promise. Like graphite, it possesses a laminar structure and shows a low co-efficient of friction. It is stable at high temperatures and adheres to metal surfaces very well. Before considering its properties in more detail, it may be of interest to review the work of Boyd and Robertson[1] who examined the friction properties of a large number of lubricants at high pressures. The following groups of lubricants were examined by these workers: (1) Mineral, animal and vegetable oils; (2) Mineral oils containing various additives; (3) Fatty acid additives; (4) Greases; (5) Solid lubricants. The method used consisted in placing the test sample between two circular hard steel anvils and measuring the torque necessary to twist one on the other for various lateral pressures.

The average co-efficient of friction for mineral oils was increased by the addition of powdered mica and colloidal graphite, but there was a notable decrease on the addition of 1 per cent finely powdered molybdenum disulphide. Stearic acid showed the lowest co-efficient of friction of any material. Mica and soapstone sheared with alternate periods of sticking and slipping for pressures above 50,000 p.s.i., the materials caking and adhering tightly to the anvil. Both tungsten and molybdenum disulphides showed very good shearing characteristics, their average co-efficients of friction being lower than for any other solid lubricants.

FRICTION OF SOLID FILMS ON STEEL INVESTIGATED

The friction of solid films on steel at high sliding velocities has been investigated by Johnson and co-workers[2]. Experimental work was carried out using both graphite and molybdenum disulphide. The sulphide was applied in a corn syrup binder to the steel surface, the temperature of which was 350 deg. C. When cold, the outer layer was scraped off with a straight edge, leaving a thin tenacious layer. The film was finally finished by light abrasion with 3/0 emery paper. It was found that such a film was very efficient in reducing friction at high sliding velocities. It was chemically and thermally stable and was satisfactory under conditions where a graphite film failed.

The actual oxidation characteristics of molybdenum disulphide have been examined by Godfrey and Nelson[3]. When molybdenum disulphide oxidizes, it forms the tri-oxide which, by itself, produces high friction. Nevertheless, as long as a subfilm of the disulphide remains, it is effective in reducing friction. The authors found that the film commenced to oxidize at 750 deg. F., the rate gradually increasing up to 1050 deg. F., when it is quite high. The oxidation characteristics of molybdenum disulphide, therefore, would appear to be such as to show considerable promise for its use at temperatures which are too high for conventional lubricants.

EFFECTIVE LUBRICATING FILM FORMED

The use of molybdenum disulphide in hot pressed bearing materials has been investigated by Johnson and co-workers[4]. The best material for this purpose, both from the point of view of friction and of wear, contained 10 per cent molybdenum disulphide. In specimens which contained less than 5 per cent molybdenum disulphide welding of the surfaces took place and in specimens containing more than 10 per cent molybdenum disulphide wear increased considerably, probably due to the lowered mechanical strength of the bearing metal. The actual mechanism consists in the transfer of the solid lubricant from the bearing metal to the steel surface with the formation of an effective lubricating film.

According to Godfrey and Bisson[5], molybdenum disulphide is potentially very valuable as a fretting-corrosion inhibitor. Fretting corrosion may be defined as the surface failure which occurs when metal surfaces, which are in close contact, undergo slight relative motion such as occurs when they are subjected to vibration. For the prevention of this type of corrosion the "syrup" method of applying the film is by far the most satisfactory.

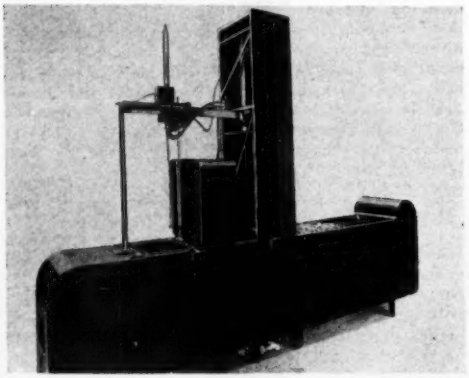
In conclusion, it may be said that molybdenum disulphide has undoubtedly proved itself in the very severe tests which have been applied to it. It has been used successfully in the lubrication of gears and in breaking in machine bearing surfaces where high stress occurs. It may be used as a lubricant in forming and drawing dies and in the cutting of threads, particularly stainless steel threads. It is undoubtedly a solid lubricant which will become much more widely used.

REFERENCES

1 *Trans. A.S.M.E.*, 67, 51, 1945.
2 *N.A.C.A., Tech. Note* No. 1578.
3 *N.A.C.A., Tech. Note* No. 1882.
4 *N.A.C.A., Tech. Note* No. 2027.
5 *N.A.C.A., Tech. Note* No. 2180.

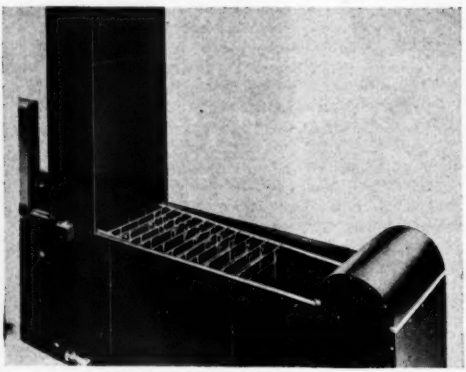
The N.R.D. Automatic Film Processing Unit

The mining industry spends considerable sums every year on the prevention, and cure, of silicosis, particularly in the anthracite and other hard coal mines, in metalliferous mines and, to a certain degree, in the quarrying industry. Any equipment which will contribute to an early and accurate diagnosis of chest diseases in miners is, therefore, worthy of the most serious consideration.



The N.R.D. automatic X-ray film processing unit with light trap panel removed to show lifting gear. The section on the extreme left contains a refrigeration unit

Medical opinion is agreed on the fact that the most accurate exposure of X-ray film and the most careful possible processing of this film are necessary if a true picture of the lung condition is to be obtained. Exposure can be made automatically and correctly by using the N.R.D. Autotimer—manufactured by Nucleonic & Radiological Developments Ltd.—which takes into account not only fluctuations in the mains, but also such unpredictable factors as variations in density of the chest between one patient and another—a condition which cannot be checked with calipers only.

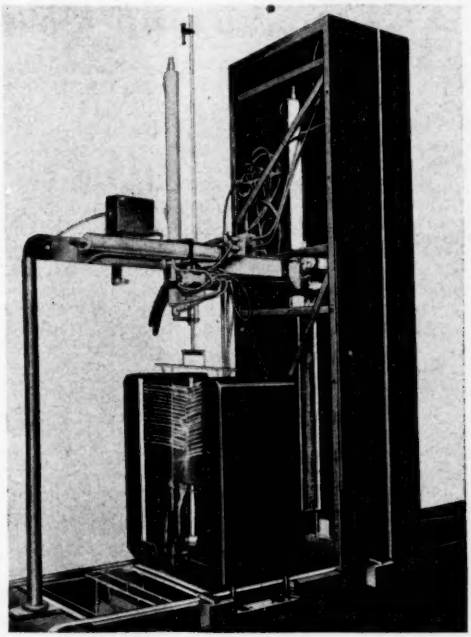


A view from the washing tank end of the unit showing gradient of conveyor belts

Assuming then that an X-ray film of fully controlled exposure to a pre-arranged density to the radiologist's preference has been obtained, the next stage is to process it under equally accurate control in order to obtain as near perfect a film as possible.

The N.R.D. Automatic Film Processing Unit—which will take films up to sizes 17 in. x 14 in.—works on a basis of time and temperature control and once the dark-room technician has mounted the exposure on the film hanger and placed it in the developing tank, it is not handled again until it emerges from the light-trap into the final washing tank. On reaching daylight, it can either be rushed off to ward or operating theatre in urgent cases and returned to the tank later to finish washing or, if it is a routine film, it can be left to be carried along to the end of the tank by the two conveyor belts.

Briefly, the method by which the equipment works is as follows: There are two synchronized belts, one each side of the tanks, which run the full length of the equipment.



A close-up of the light trap. Note the film being washed; the monorail carrying the two pneumatic lifting and traversing units and the self-closing rubber "gates" at the bottom of the light trap

The projecting cross bar of the film hanger rests on these belts and is carried forward by them at a controlled speed; when the film hanger reaches the end of the developing tank, it touches the first micro-switch which brings into action a pneumatic lifting and traversing gear. During the process of being carried forward to the fixing tank, into which it is lowered automatically, a spray-rinse comes into operation, again automatically, and completely washes away any developer solution remaining on the film. When the hanger reaches the end of the fixing tank, a similar lifting and lowering gear cuts in as soon as the second micro-switch is touched by the film hanger, which is again lifted clear of the tank, carried forward over a light trap and lowered into the final washing tank in which there is a

continuous flow of water travelling slowly in the opposite direction to the film hangers. The cycle of movements performed by the pneumatic gear is: lift, forward travel, lower, return travel.

Temperature control of the developer is provided for normal use, and for tropical use a refrigeration unit can be provided as an extra. Compressed air is supplied by a small, but adequate compressor, which is provided as part of the equipment so that the Processing Unit is quite independent of the main compressed air supply: this is a distinct advantage if the radiography section happens to lie at a considerable distance from the compressed air generator, and is indispensable if the Unit is to be fitted to mobile equipment.

The third important factor is the chemical condition of the developer. A technique has been evolved, based on the number of films processed per day, whereby it is possible to replenish and regenerate the developer each morning. It is thus possible to standardize the developer almost completely, and experiments over more than two years have shown that it is possible to maintain a satisfactory chemical consistency for at least 12 months without once emptying the developer tank. An automatic counter on the machine records the number of films processed daily.

Further control of the developer can be maintained by the use of "test strips" which are small sections of X-ray film exposed so as to give a step wedge effect, and can be compared with a small portion of the X-ray film which has been through the Processing Unit. The whole work involved in checking and regenerating the developer can be done in about 15 minutes daily.

COLONIAL MINERALS DEVELOPMENT—VI

British Honduras

By A. G. THOMSON

In the following article—the sixth in a series devoted to the mineral wealth of the smaller British overseas territories—reference is made on the results of geological surveys carried out in British Honduras. Special mention is made of the search for gold and the possibilities of discovering petroleum.

British Honduras—the only British Colony in Central America—stretches northwards from the Gulf of Honduras for approximately 200 miles, and has an area of 8,260 sq. miles. It is bounded on the east by the Caribbean Sea, and on its other boundaries it adjoins the republics of Mexico and Guatemala. The river Belize traverses the centre of the country, and the Rio Hondo and the Sarstoon form the north-western and southern boundaries respectively. The land along the coast is low and swampy, but mountains in the interior rise to about 4,000 ft.

The early settlers were originally buccaneers and, subsequently, log-cutters. For many years they were repeatedly attacked by the Spanish, but their occupation of the territory was formally recognized in 1798, after the repulse of an invasion fleet and a land-force of 2,000 men. Since 1862, British Honduras has ranked as a British Colony. Belize, the capital, is also the principal port and serves Central America with British goods.

The export trade consists almost entirely of mahogany and pine, but the Colony also produces sugar, coffee, cotton, sarsaparilla, bananas, plantains and india rubber. There has been no recorded mineral production, and much work has yet to be done before future possibilities can be accurately assessed.

There has been little prospecting in the past, and operations were usually confined to a search for gold on the eastward edge of the mountains. Gold mining is carried on in Honduras, but the only gold mine in Guatemala is a placer deposit near the Honduras frontier. Silver-lead is known in the western portion of Guatemala. So far, however, prospectors have apparently failed to discover payable occurrences within the limits of the British territory.

NO WORKABLE MINERAL DEPOSITS DISCOVERED

A Geological Survey was started in 1921 by the late Leslie H. Ower, D.I.C., F.G.S., F.R.G.S., who produced a geological map of the Colony, but it was abandoned at the end of 1926, after no minerals in workable quantities had been located. Streams likely to be metalliferous were prospected by the Survey and assays were made of some outcrops that appeared promising. Though gold was not discovered in payable quantities, traces were found in the Belize River and beneath several culverts on the Stann Creek Railway. Casual assays of the quartzites and conglomerate beds in the folded Upper Carboniferous Rocks yielded over 1 dwt. per ton, but no attempt was made to define the main auriferous horizon.

Some granitic masses are stanniferous in their contact with the Upper Carboniferous Rocks, into which they have been intruded. Tin was originally discovered by the Survey near the source of Stann Creek, but no payable values were encountered, although the whole area was thoroughly prospected. Molybdenite and monazite occur in the granitic detritus, the latter in some quantities in one of the streams prospected, but search has yet to be made for the source.

SURVEY OF MAYA MOUNTAINS

When Ower's survey was carried out, British Honduras did not have the road communication with the interior which exists to-day, and consequently much of the Maya Mountain area remained unsurveyed. In September, 1950, the Senior Geologist of the Geological Survey, British Guiana, was seconded to the Government of British Honduras in order to carry out a survey of the Maya Mountains and search for minerals. A prospector was appointed as Field Assistant and the actual survey was started in October, 1950. An area amounting to 500 sq. miles has been geologically mapped and prospected by the present team, and it is hoped that the work now in progress will enable the geological map to be completed. All heavy mineral concentrates and rock samples are forwarded to British Guiana for laboratory examination.

Recent work has confirmed reports of traces of gold in one of the rivers and tin in another, but deposits of commercial importance have not yet been identified. Baryte has been found in considerable quantity, and occurrences of gypsum are known, but have not yet been investigated.

Oil possibilities have been examined by the Shell Overseas Exploration Co. Ltd., but this company did not investigate areas of crystalline rocks which could not be regarded as potential oil producers. Detailed examinations of British Honduras and the adjacent country have suggested that the possibilities of obtaining petroleum may be more hopeful than was originally supposed and the Gulf Oil Corporation now has a prospecting licence covering the whole of the Colony.

TECHNICAL BRIEFS

Australian Iron-Ore Smelting Research

Research undertaken by a German metallurgist, Dr. E. Pohl, may enable Western Australia—which has only low-grade coal deposits of any size but ample supplies of iron-ore—to set up its own iron and steel industry.

According to a Reuter despatch from Perth, Dr. Pohl's research has made it a practical possibility for the low-grade coal available in the Collie coalfield to be utilized for steel and pig-iron production.

New Coating Process for Aluminium

A nickel-coating process which is claimed to give aluminium the hardness and resistance to corrosion of nickel has been announced by the Hamilton Standard Division of the United Aircraft Corporation and the Bart Laboratories Inc. The essential element in the process is stated to be a synthetic rubber compound used to establish a bond, formerly unattainable, between the aluminium and the nickel plate. The plating process takes about 24 hours and the finished pieces have a semi-bright surface, but can be polished chemically or mechanically to a high lustre.

This development is considered to be of major importance in protecting duralumin propeller blades from the pitting and eroding effects of spray thrown up in sea landings.

Using Sea Water in Sulphur Mining

Evolved as a result of eight years of laboratory experiment and pilot plant operation, the Freeport Sulphur Co. has developed a new process making it possible to use brackish or sea water for mining sulphur in tidewater areas, according to a recent statement by Mr. Z. W. Bartlett, assistant general manager of the company's operations in Louisiana and Texas.

This development makes it possible for the first time to extract the short yellow element from underground salt domes at locations where fresh water is not available and the cost of piping it from distant sources would be prohibitive. The unique process, which is expected to stimulate greater interest in prospecting for marshland brimstone, solves the problems of corrosion and scale which heretofore made impossible the use of water having a high salt content for sulphur mining.

The company will use the process to mine a deposit of elemental sulphur at Bay Ste. Elaine, a marshy area near the Gulf of Mexico, 35 miles from the only source of fresh water. The plant itself is an innovation in that it will be built on a huge barge, the first marine operation in sulphur mining history. Nearly 2,000,000 gallons of superheated water a day will be pumped underground to melt the brimstone.

Basically, the process consists in the controlled heating of sea water under pressure to the required mining temperature of 325 deg. F. and in removing from the water all but a minute part of the corrosion-dealing oxygen. Special controls prevent the decomposition in the salt water of scale-depositing bicarbonates. At the same time, the removal of oxygen reduces corrosion which otherwise would be excessive because of the extreme heat.

Mr. Bartlett said that the normal approach to the elimination of scale would be to remove all or part of the calcium and magnesium by chemical treatment. However, the high costs involved in such a course, due to the large amounts of these elements in sea water, made the problem one of preventing the breakdown of the minerals rather than attempting to eliminate them.

The removal of oxygen, the company's official explained, is accomplished in an apparatus consisting of a tower in which cold sea water flows downward through packing. Water in the upper part of the tower is contacted with flue gases from steam boilers and in the lower part with the products of combustion of natural gas. As the temperature of the water is raised, the gases de-aerate it, reducing the oxygen content to less than 1 lb. per 10,000,000 lb. of water. The water is heated to 190 deg. F. and then raised to mining temperatures with steam in indirect heat exchangers.

The Storage of Sour Crude Oil

According to C. P. Larrabee and W. F. Rogers (*Corrosion* 7, 276, 1951), the corrosive conditions which occur on the bottoms of sour crude oil storage tanks may best be combated by the use of austenitic stainless steel. A number of tests indicated that the highest resistance to pitting corrosion is shown by molybdenum containing stainless steels Types 316, 316-1, 316 Niobium and 317. The authors state that these types are definitely superior to stainless steels containing molybdenum.

Destruction of Flotation Froth with High Frequency Sound

In the flotation of minerals, and in particular coal, the presence of tough froth may cause trouble in subsequent stages. Experiments have been carried out in the laboratory by S. C. Sun on the effects of high frequency sound on the destruction of such a froth (*Trans. Am. Inst. Min. Met. Eng., Tech. Pub. No.* 3115*B*, 1951). A siren was used for the purpose and consisted of a 6 in. diameter rotor disc having a hundred slots and driven at 133 r.p.m. The rotor interrupted the flow of air through an orifice in the stator and the frequency of the sound produced varied from 3 to 34 kilocycles. A reflector was used in order to intensify the sound and it was found that for a chamber pressure of 30 lb. per sq. in., the optimum frequency of defrothing was about 6 kilocycles per sec.

Synthetic Cryolite to be Made by Reynolds Mining Co.

Cryolite, essential for making aluminium out of alumina, is found in Greenland, and the available supply will not last more than six to eight years, it is estimated. In the face of these dwindling supplies, the Reynolds Mining Corporation, a subsidiary of the Reynolds Metal Co., one of the big three of the U.S. American aluminium industry, has initiated action to manufacture synthetic cryolite from fluorspar. The company has purchased the Poncha Springs Fluorspar Mine in Colorado and has already started producing acid-grade fluorspar required in the production of aluminium. Cryolite, which is produced from the fluorspar, is first melted in an electrolytic cell at about 1,800 deg. F. by means of an electric current. Alumina is then dissolved in the molten cryolite and direct current is applied. The electrolytic action breaks down the alumina into aluminium and oxygen. According to Walter R. Rice, president of Reynolds Mining Corp., one-twentieth of one lb. of cryolite is required to make one lb. of aluminium. The company will make its synthetic cryolite in a separate plant located at Hurricane Creek, Arkansas.

"Loss-in-Weight" Test Predicts How Iron Ore Will React In Blast Furnace

"Loss-in-Weight" is the name of a new time-saving laboratory test developed by the U.S. Bureau of Mines, that predicts quickly and accurately how iron oxide ore from a newly-opened deposit will react in a pig-iron blast furnace. The test has already resulted in a more efficient blast furnace operation, increased iron production and the conservation of scarce coke, and has saved industry many months of making comparative tests. The test is conducted in an electrically-heated retort, suspended from a sensitive balance or scale used to determine the amount of oxygen removed from an iron oxide charge. It is considered an improvement over other methods because of the rapid direct weighing, carried out while the charge is in the retort. The test can be completed within a few hours. Information so obtained enables industry to prepare iron oxide materials so as to get maximum iron production in the blast furnace. In practice, the results obtained from a loss-in-weight test prompted one steel company to crush the ore to finer size, which led to increased iron production.

In running a loss-in-weight test, the ore sample is crushed to the desired size and heated in the retort, using hydrogen as a reducing gas. The rate at which the oxygen is removed from the ore is disclosed by weighing the charge periodically with the scale. The oxygen combines with hydrogen to give water, which is vaporized.

METALS, MINERALS AND ALLOYS

President Truman is faced with a considerable dilemma as a result of the Wage Stabilisation Board's recommendation of wage increases estimated to cost the steel industry between 26c. and 30c. an hour on direct costs plus another 30c. for indirect costs. If these recommendations are accepted they will add about $12 a ton to steel costs. Their acceptance depends upon the extent of the rise in steel prices which the Administration will permit. If they are sufficient the country will get its steel but only at the cost of considerable added inflationary pressure. If not, the steel masters will resist the wage increases and the steelworkers will strike on April 8. Either way the price of steel looks like rising—it remains to be seen by how much.

The United Steelworkers of America also represent the aluminium workers who have been awaiting the outcome of the steel dispute to press their own wage claims which are now clearly considerably strengthened.

The increase in the bank rate has given British metal industries an added incentive to run down their stocks of those metals for which the market has been easing since the beginning of the year. It remains to be seen whether the Government will consent to act as stockholder for British industry, or will take the slackening demand at its face value and take the opportunity to cut down on hard currency expenditure for these items. It is in a market situation of this sort that the absence of free dealings on the Metal Exchange are apt to be particularly felt.

COPPER.—So long as U.S. exports of copper continue to fetch prices ranging from around 29c. f.a.s. per lb. for deliveries to the U.K. up to the 45c. reported to have been obtained from Austria, the U.S. Government is likely to find it increasingly difficult to defend its fixed price policy for domestic and imported copper. Although no official statement was issued after the meeting between a Chilean delegation and representatives of Anaconda, Kennecott and the U.S. Government, it is believed that Chile has proposed selling her entire output to the States at 33½c. per lb. At present the U.S. takes 80 per cent of total production at 27½c. per lb., and Chile is free to sell the remaining 20 per cent at whatever prices can be obtained. In effect, the Chileans are asking the U.S. to pay 57½c. per lb. for the marginal 20 per cent and this is far from certain.

Meanwhile, the U.S. Government has further undermined its domestic policy by two further high price agreements with high cost producers, bringing the total of such agreements to four. A price of 33.8c. per lb. will be paid for a maximum of 3,186 s.tons of copper from the Champion Mine, owned by the Copper Range Co. An earlier contract related to a subsidiary of this company. The second agreement is with the Banner Mining Co. for an annual output of 2,719 s.tons; the price in this instance is 30.53c., as compared with a domestic price of 24½c. and an export price of 27½c. The contracts terminate towards the end of next year, but can be ended on 60 days' notice by the removal of price controls.

Nothing more has been heard of the suggestion that the copper-lead-zinc committee of the I.M.C. is studying how to increase the period for which allocations can be made. As the copper allocations for the second quarter of the year are expected in the immediate future, some announcement might be made then. There has been a report that the copper allocations will be reduced because they were based on expectations, dubbed over-optimistic, of bigger production. The cut will, according to the report, apply to all members of the conference. Meanwhile, imports of refined copper into the U.S. in January were the highest for several years: refined copper imports were 32,905 tons, blister imports 13,487 tons and ore and matte, 5,608 tons.

LEAD.—The downward pressure on the price of Mexican lead has eased, at least temporarily. The latest price of 18.16c. per lb. f.o.b. Monterey compares with 18.19c. a week earlier and 18.42c. a fortnight previously.

A severe decline in the amount of lead imported from Yugoslavia and Mexico into the U.S. in January accounted for the sharp drop in total imports. According to the Bureau of Metal Statistics, total imports reached only 10,221 tons, against 15,534 in December. Yugoslavia sent 882 tons as compared with 4,316 in December, and Mexico reduced her share to 1,821 tons from 2,902.

TIN.—Another agreement has been signed by the U.S. This time it is with the Belgian Congo producers. The price of $1.20¼ per lb. delivered seems in line with the contracts negotiated with the U.K. and Indonesia; the agreement contains the now familiar feature of an automatic increase if a more favourable price is granted to any other producer. The amount to be delivered in a year is 7,000 tonnes, but an amount equal to 75 per cent of any increased Congo production can also be delivered up to an extra amount of 2,000 tonnes. If the seller, however, so wishes an extra 10 per cent can be added to the minimum amount and also to the provision for additional production. The contract provides for a cancellation clause at the option of the seller, if the index of American industrial prices rises by 15 per cent. Provision has also been made for the U.S. to pay any increase in freight and insurance charges, and presumably, the U.S. will derive any benefit from a reduction in these charges. At least 2,000 tonnes of the quantity delivered is to be in the form of tin concentrates. This agreement means that the Congo producers are assured of a fixed price for slightly more than one-half of their total output, and hard currency earnings of $36,000,000 over the period of two years of the contract.

The Bolivians are now the last important producers to be negotiating a contract with the U.S., and it seems clear that the inclusion of an automatic price increase clause in the agreements already reached with other producers must militate against the Bolivian's claim for a higher price, although the Bolivians will no doubt make what use they can of American domestic policy regarding high cost copper producers. The discussions will be resumed in Washington next week.

ZINC.—The surplus zinc left with the Ministry of Materials in February has led to some hope that the restrictions on end-uses—one of the reasons producing the surplus—might be removed. Industrialists are complaining that they are losing overseas trade because of their inability through regulations to supply customers' requirements and because manufacturers of other nations, especially of Belgium, are not subject to the same frustrations. It is feared here that if the total I.M.C. allocation is stepped up no benefits will come to the U.K. This would, of course, restrict any relief which can be given to industry; the present surplus would seem to be destined for helping the overseas trade rather than extending the domestic market.

While various American copper company executives are trying to convince the world that there is no desperate and continuing shortage of copper, Mr. Sam Sacks of the American Zinc Co. has been attempting to assure listeners that zinc is not weak. One reason he gave for the recent decline in prices was the cessation of buying in France and Belgium as a cover against the depreciation of the currency. He suggested that some of these private hoards were now being run down, creating a surplus as synthetic as the previous shortage. He took encouragement from the increased allowance for motor production; altogether he did not anticipate any great change in the price.

ALUMINIUM.—The cuts in imports into Australia announced recently are to be accompanied by efforts to make the Dominion self-supporting in aluminium supplies. The plant at Bell Bay, Tasmania, is to be enlarged so that it will be able to produce 13,000 tons per annum. This expansion and the rise in costs of completing the plant as originally planned have caused the Federal Government to spend a further £A.4,000,000; this will bring the total cost up to £A.7,000,000. Melbourne reports state that 1,000,000 tons of bauxite have been proved in Victoria and that it could be easily shipped to Tasmania. The bauxite is claimed to have a higher alumina content than any other discovered in Australia.

The expansion in the production of aluminium in the U.S. is gathering momentum. In January the output of primary aluminium was 76,934 s.tons as compared with 72,454 s.tons in December, 1951 and 67,954 in January, 1951. To find a monthly figure so high as that of last January, it is necessary to go back to April, 1944, when 77,800 tons were produced.

MAGNESITE.—The improvement recently reported in the production of magnesite in Austria has enabled exports to be increased. Overseas sales of sinter magnesite in 1951 were 90,600 tons as compared with 70,300 the previous year and the export of magnesite brick and blocks climbed from 95,000 s.tons to 110,000 s.tons.

URANIUM.—The South African Minister of Mines has stated that the production of uranium will be three times as great as originally thought; the number of mines involved will also be three times as large. Production at one mine is expected to begin in about six weeks' time.

The Australian Government's sub-committee on the uranium potential of Radium Hill in South Australia and of Rum Jungle in Northern Territory is understood to have recommended to the Cabinet that both projects should be vigorously pursued and the help of American capital and equipment sought to expedite development. Radium Hill is expected to be able to produce uranium oxide in commercial quantities within the next twelve months. The committee has recommended that uranium exports should be earmarked for the joint use of Britain and the U.S. and that a portion of the production should be retained for domestic industrial development. The Cabinet is understood to regard uranium as being currently Australia's best dollar earner.

The London Metal Market

(From Our Metal Exchange Correspondent)

The prices of tin in London and Singapore have drifted downwards throughout the last week, and there appears to be no reason why this trend should alter. A welcomed development has been the establishment of a contango, and it is hoped that this will reach a figure which makes the financing of tin stocks a profitable business.

The news from America is that Belgian tin producers have signed a two-years contract, the terms of which are referred to elsewhere. The Bolivian negotiations are making little progress, and it is understood that the next meeting is not until early next week when it is believed that the Bolivians will once more put forward a price well in excess of that governing the R.F.C. contracts with the British Indonesian and Belgian producers.

The market in other metals remains featureless with buyers' and sellers' prices being some pounds apart, but it is the general opinion that it will have to be the sellers who eventually adjust their ideas.

On Thursday the official close on the tin market was: Settlement price £961, Cash Buyers £961, Sellers £961 10s.; Three months' Buyers £966, Sellers £966 10s. In the afternoon the market was steady. Turnover for the day was 40 tons. Approximate turnover for the week was 875 tons.

The Eastern price on Thursday morning was equivalent to £973 10s. per ton, c.i.f. Europe.

Iron and Steel

The most acute phase of the steel shortage will soon be over. This is the prevailing opinion in trade circles and it is not merely a case of wishful thinking. Hedged around with difficulties in obtaining adequate supplies of raw materials, expansion of steel production is very slow, but some progress has been made, and it has been possible to sanction small increases in the allocations for the second control period which begins on April 1.

The export demand for steel is a little less insistent, in consequence of import restrictions in Australasia and curtailment of credit facilities in Canada. Moreover, the wide gap between British and Continental prices has been largely eliminated. Nevertheless, British makers have important export orders in hand, and home demand is as strong as ever.

There is no perceptible improvement in the deliveries of either home or foreign scrap to the steel works, but the output of basic pig iron is gradually rising and will in time favourably influence ingot production. No less urgent is the demand for all grades of foundry iron. Current deliveries are barely adequate to keep the foundries in full employment and until bigger tonnages are available there is no possibility of replenishing the stockpiles.

The sheet makers and re-rollers of small bars and light sections are still in dire need of steel semis in the form of sheets, bars, slabs and billets. They are now pinning their hopes upon the early arrival of promised shipments from U.S.A. although it is reaffirmed that these will not be in full spate until June or July.

Demand for finished steel extends over a very wide range. Big tonnages are on order for pipe lines and oil storage tanks in the Middle and Far East whilst at home the insistent needs of the shipyards, marine and structural engineering shops, wagon and locomotive builders and power plant producers cannot be fully satisfied. It is noticeable, however, that rearmament requirements are not imposing such a heavy drain upon our steel resources as had been anticipated and it is thought that this may permit of the progressive easement of the restrictions upon the use of steel in other directions. Engineers are confident that they can develop their export trade if more steel is placed at their disposal.

MARCH 27 PRICES

COPPER

Electrolytic	£227 0 0 d/d

TIN

(See our London Metal Exchange report for Thursday's prices)

LEAD

Soft foreign, duty paid	£163 0 0 d/d
Soft empire, including secondary lead ...	£163 0 0 d/d
English lead	£164 10 0 d/d

ZINC

G.O.B. spelter, foreign, duty paid ...	£190 0 0 d/d
G.O.B. spelter, domestic...	£190 0 0 d/d
Electrolytic and refined zinc	£194 0 0 d/d

ANTIMONY

English (99%) delivered, 10 cwt. and over	£340 per ton
Crude (70%)	£275 per ton
Ore (60% basis)	40s./42s. 6d. nom. per unit, c.i.f.

NICKEL

99.5% (home trade)	£454 per ton

OTHER METALS

Aluminium, £148 per ton.	Palladium, £8 10s. oz.
Bismuth, 28s. lb.	Platinum (scrap), £33.
Cadmium, 18s. 9d. lb.	Platinum, £27/33 5s. nom.
Chromium, 6s. 3d. lb.	Rhodium, £45 oz.
Cobalt, 20s. lb.	Ruthenium, £30 oz.
Gold, 248s. f.oz.	Quicksilver, £73 10s./£74 ex-warehouse.
Iridium, £65 oz. nom.	Selenium, 25s. nom. per lb.
Magnesium, 2s. 10½d. lb.	Silver (bar), 77d. f.oz. spot and forward.
Osmiridium, £35 oz. nom.	Tellurium, 19s. lb.
Osmium, £70 oz. nom.	

ORES, ALLOYS, ETC.

Bismuth	30% 12s. 9d. lb. c.i.f. 20% 10s. 3d. lb. c.i.f.
Chrome Ore—	
Rhodesian Metallurgical (lumpy)	£13 per ton c.i.f.
,, ,, (concentrates)	£13 per ton c.i.f.
,, ,, Refractory	£12 12s. per ton c.i.f.
Baluchistan Metallurgical ...	£14 16s. per ton c.i.f.
Magnesite, ground calcined ...	£26 - £27 d/d
Magnesite, Raw	£10 - £11 d/d
Molybdenite (85% basis) ...	103s. 1½d. per unit c.i.f.
Wolfram (65%), U.K. ...	485s. nom. c.i.f.
Tungsten Metal Powder (for steel manufacture) ...	35s. nom. per lb. (home)
Ferro-tungsten	33s. nom. per lb. (home)
Carbide, 4-cwt. lots	£30 3s. 9d. d/d per ton
Ferro-manganese, home ...	£43 15s. 2d. per ton
Brass Wire	2s. 7½d. per lb. basis.
Brass Tubes, solid drawn ...	2s. 1d. per lb. basis.

THE MINING MARKETS

(By Our Stock Exchange Correspondent)

Falls preponderated in the Stock Exchange this week. Gilts, however, generally moved better but every other section was depressed. Investors showed definite preference for dated stocks of a medium term.

This column is at some disadvantage in that the Finance Act, upon which so much hangs, is expected to be published as we go to press. The £ sterling abroad again went better against almost all currencies, a recognition of Mr. Butler's realistic attitude. An important factor affecting the general finances of the country was the greatly improved position of coal stocks. We can now export coal again, albeit in restricted quantities. This should help to pay for food which otherwise would have required foreign exchange.

Depression continued in base metal shares. Although the technical position of copper is strong, investors are clearly frightened of the longer term outlook. Companies still registered in the U.K. have shown less heavy declines than some which recently emigrated. This appears paradoxical, since the former are bound to attract E.P.L., although to what extent this will be mitigated by the Finance Act is yet unknown. Coppers were further depressed by an announcement from Mufulira, where production of copper will be considerably below normal for the current quarter. The reason is given as the shortage of coal caused by floods. This is bound to affect costs as Mufulira is a wet mine requiring heavy pumping. Mazapil Copper, which owns mines in Mexico, announced that an approach has been made by a substantial company with a view to an option to purchase the assets for cash. In this event, the board estimated that the price would be in excess of the then market value of 25s. a share. These later jumped to 28s. 9d.

Consolidated Murchison again fell away. The technical position of antimony is uncertain despite the recent cut of £25 a ton in the U.K. price. Bear covering in the Cape hardly checked the downward trend.

Lead/zinc shares reflected investors doubts on the commodity position, but fear of E.P.L. was the main cause of decline in Consolidated Zinc and other U.K. registered mines.

Selukwe Gold, whose main asset is now the Silbak Premier Mine, reported an operating loss for February of $6,800. This is a lead/zinc proposition operating in Canada. Unless the position improves this old mine, recently re-opened, may again find itself in difficulties.

Shareholders in tin mining companies, as with those in other commodities, anxiously await the provisions of the Finance Act.

Kaffirs had a bad week. The serious political troubles in the Union intensified the usual anxious period before the Budget. It is as yet too early fully to analyse the effects of this latter, but the fact that no change was made in the taxation of gold and that the tax on diamond producers was not increased as much as was feared immediately brightened this market. It seems probable that genuine investors will remain cautious until a more stable political basis is reached.

February Rand mining costs were again up at an average of 34s. 9d. per ton against 33s. 4d. in January. The South African Minister for Mines stated that the O.F.S. is expected to produce uranium. It is already known that the West Rand are taking a leading part in this connection. West Driefontein and Blyvoors have also been mentioned.

West Africans were thoroughly depressed. Ashantis, at their ex-dividend price of 21s. were at their lowest level for twenty-five years. Lyndhurst produced a welcome surprise by declaring a 15 per cent dividend against 5 per cent for the previous year. The profit is up at £52,132 as against £21,624 last year.

	Price Mar. 26	+ or − on week
FINANCE		
African & European	2⅜	.....
Anglo American Corpn.	7⅛	.....
Anglo-French	21/-	−3d
Anglo Transvaal Consol.	32/6	−3/1½
Camp Bird	11/3xd	−6d
Central Mining (£1 shrs.)	37/6	−7½d
Consolidated Goldfields	49/4½	−7½d
Consol. Mines Selection	28/1½	−1/10½
East Rand Consols	3/1½	−3d
General Mining	4⅜	+ ⅛
H.E. Prop.	32/6	−1/3
Henderson's Transvaal	11/6	−9d
Johnnies	3⅛	− ⅛
Rand Mines	5⅛	.....
Rand Selection	41/3	−1/10½
Union Corporation	8⅛	.....
Vereeniging Estates	4⅛	− ⅛
Writs	31/3	−2/6
West Wits	45/7½	−1/3
RAND GOLD		
Blyvoors	42/6	−4½d
Brakpan	19/9	+3d
City Deep	41/3	.....
Consol. Main Reef	38/9	−1/3
Crown	3⅛	− ⅛
Daggas	3⅛	− ⅛
Dominion Reefs	2/-	−4½d
Doornfontein	24/9	−1/9
Durban Deep	3⅛	−½
E. Daggas	21/3	−7½d
E. Geduld ... (4/- units)	45/7½	−1/3
E. Rand Props.	3⅛	− ⅛
Geduld	6½	.....
Grootvlei	34/9	−3d
Libanon	14/9	−6d
Luipaards Vlei	19/9	.....
Marievale	22/6	−3d
Modderfontein B.	5/3	+3d
Modderfontein East	30/-	−1/3
New Kleinfontein	32/6	.....
New Pioneer	14/6	−1/10½
Randfontein	21/-	−6d
Robinson Deep	13/9	−3d
Rose Deep	32/6	−1/3
Simmer & Jack	6/7½	.....
Springs	9/3	−3d
Sub Nigel	2⅜	− ⅛
Van Dyk	13/6	−6d
Venterspost	21/10½	−1/10½
Vlakfontein	18/6	+3d
Vogelstruisbult	27/6	−3d
West Driefontein	6⅞	− ⅛
W. Rand Consolidated	50/-	−1/10½
Western Reefs	42/6	−1/3
O.F.S		
Alpha F.S.A.	7/8	.....
Blinkpoort	17/6	−1/3
Central Mining F.S.	3/9	−3d
Freddies	7/9	−6d
Freddies N.	6/7½	−7½d
Freddies S.	7/9	−6d
F.S. Geduld	3	− ⅛
Geoffries	18/6	−1/10½
Harmony	19/-	−3d
Lydenburg Estates	10/3	−4½d
Middle Wits	17/-	−1/-
Ofsits	38/9	−2/6
President Brand	15/9	−1/-
President Steyn	13/9	−1/-
St. Helena	16/10½	−6d
U.F.S.C. & G.	6/9	−9d
Virginia Deb.	73	.....
Virginia Ord.	9/9	−3d
Welkom	31/3	−7½d
Western Holdings (New)	3⅛	− ⅛
WEST AFRICAN GOLD		
Amalgamated Banket	1/9	.....
Ariston	5/7½	−4½d
Ashanti	21/-xd	−2/6
Bibiani	7/4½	−4½d
Bremang	2/9	.....
G.C. Main Reef	3/3	.....
G.C. Selection Trust	6/3	−6d
Konongo	3/-	−1½d
Kwahu	4/3	.....
London & African Mng.	1/7½	.....
Lyndhurst Deep	1/4½	.....
Marlu	1/9	.....
Nanwa	5d	.....
Taquah & Abosso	4/3	−6d
AUSTRALIAN GOLD		
Boulder Perseverance	2/6	−1/-
Gold Mines of Kalgoorlie	9/6	−3d
Great Boulder Prop.	5/6	−3d
Great Western Consol.	6/10½	+1½d
Lake View and Star	16/-	−1/-
Mount Morgan	16/3	−9d
North Kalgurli	12/6xd	−1/6
Paringa	6d	.....
Sons of Gwalia	9/6	−6d
South Kalgurli	8/3	−3d
Western Mining	7/4½	−1½d
Wiluna	5/9	.....
MISCELLANEOUS GOLD		
Cam and Motor	36/10½	−7½d
Champion Reef	7/3	−4½d
Falcon Mines	8/-	−6d
Globe & Phoenix	24/6	+3d
MISCELLANEOUS GOLD (contd.)		
G.F. Rhodesian	6/9	−3d
London & Rhodesian	4/10½	−3d
Motapa	2/-	−1½d
Mysore	4/6	−3d
New Guinea	1/6	.....
Nundydroog	5/9	.....
Ooregum	3/-	− ⅛
Oroville	11/3xd	−9d
St. John d'El Rey	32/6	.....
Zams	35/7½	.....
DIAMONDS		
Anglo American Inv.	4⅛	− ⅛
Casts	30/3	−1/3
Cons. Diam. of S.W.A.	4⅛	− ⅛
De Beers Defd. Bearer	66/9	−2/6
De Beers Pfd. Bearer	14½	+ ½
COPPER		
Chartered	58/9	−1/3
Indian Copper	3/7½	+1½d
Mesina	3⅜	− ½
Nchanga	6⅜	− ⅛
Rhod. Anglo-American	55/6	−5/6
Rhodesian Selection	16/4½	−7½d
Rhokana	19½	− ½
Rio Tinto	19	− ½
Roan Antelope	12/4½	−6d
Selection Trust	37/6	−3/-
Ta.ks	57/9	−2/3
Tharsis Sulphur Br.	48/9	.....
TIN (Eastern)		
Anglo-Burma	2/9	.....
Ayer Hitam	25/7½xd	−1/4½
Bangrin	9/4½	.....
Gopeng	12/3	.....
Hongkong	9/-	.....
Ipoh	22/6xd	−7½d
Kamunting	10/10½	−3d
Kepong Dredging	6/10½xd	−6d
Kinta Tin Mines	15/4½xd	−3d
Kramat Pulai	4/10½	.....
Malayan Dredging	20/6	−6d
Pahang	14/6	−3d
Pengkalen	9/4½	−7½d
Petaling	15/-	−3d
Rambutan	14/-xd	−9d
Siamese Tin	20/-	.....
Southern Kinta	14/1½	−3d
S. Malayan	23/6	−3d
S. Tronoh	16/3xd	−1/3
Sungei Kinta	18/1½	−6d
Tekka Taiping	8/9	.....
Tronoh	24/-xd	−1/-
TIN (Nigerian and Miscellaneous)		
Amalgamated Tin	8/10½	−4½d
Beralt Tin	21/6	−3d
Bisichi	3/6	−1½d
British Tin Inv.	15/4½	−4½d
Ex-Lands Nigeria	5/-	.....
Geevor Tin	12/-	−2/-
Gold & Base Metal	3/10½	−3d
Jantar Nigeria	5/6	−6d
Jos Tin Area	11/-	.....
Kaduna Prospectors	4/3	.....
Kaduna Syndicate	5/4½	+1½d
London Tin	5/1½	−4½d
Ribon Valley	1/-	−1½d
United Tin	2/6	.....
SILVER, LEAD, ZINC		
Broken Hill South	43/-	−9d
North Broken Hill	3/3	+6d
Consol. Zinc	24/-	−2/9
Lake George	16/6	−9d
Mount Isa	35/-	−9d
New Broken Hill	23/3	−1/-
Rhodesian Broken Hill	16/6	−6d
San Francisco Mines	33/3	+1/3
Trepca	3/7½	−1½d
MISCELLANEOUS		
BASE METALS & COALS		
Amal. Collieries of S.A.	46/3	−2/6
Associated Manganese	39/-	−6/-
Chinese Engineering	3/9	.....
C.P. Manganese	44/-	−4/3
Natal Navigation	3⅛	− ⅛
Wankie	17/-	−3d
Witbank Colliery	2⅜	− ⅛
CANADIAN MINES		
Dome	$33½	−$⅛
Hudson Bay Mining	$110	−$6
International Nickel	$78⅜	−$4⅛
Mining Corpn. of Canada	£5⅜	−£⅛
Noranda	$141½	+$⅜
Quemont	£7⅜	−£⅛
OIL		
Anglo-Iranian	5⅜	+ ⅛
Apex	43/9	−1/10½
Attock	23/9	−1/3
Burmah	60/7½	+1/3
Canadian Eagle Bearer	29/3	−6d
Mexican Eagle	22/1½	−6d
Shell	4⅛	+ ⅛
Trinidad Leasehold	29/6	−9d
T.P.D.	28/6	−1/6
Ultramar	33/9	−9d

COMPANY NEWS AND VIEWS

St. Helena's Milling and Ore Reserves

A first computation of ore reserves is given in the 1951 annual report of St. Helena Gold Mines, together with detailed information of crushing results.

This Orange Free State producer under the technical control of the Union Corporation, brought the reduction plant into commission in November last, after trial runs which started in July, and by the end of the year, 81,000 tons of ore had been crushed. It was derived largely from development and resulted in a working loss of £43,995. Working revenue was £159,805, less costs £203,800 which, after taking into account sundry revenue and expenditure, left a debit balance to be carried forward of £35,640. Mention is made of the proposal to redeem the loan from the Union Corporation out of the sum of £1,700,000 raised by an issue of shares in January of this year which, of course, the balance sheet figures at December 31, 1951 does not reflect. Fixed assets, property, plant and General Capital Expenditure figure at £8,493,757 with current assets of £643,343.

The footage of development on the Basal and Leader Reefs was 40,205 ft., and of the 14,315 ft. sampled on the former, 31 per cent proved payable with a value of 345 in.-dwt. Payability of the Leader Reef was 15 per cent of the 440 ft. sampled, value 149 in.-dwt. A major strike fault was encountered between the 8th and 12th levels. The reef on the east side is thrown down, with the result that there will be no stopes available between these levels for some time to come. The ore reserves have been calculated as at December 31, 1951 and amount to 625,000 tons, value 5.9 dwt. over an estimated stoping width of 48 in. Diamond drilling operations continued on a large scale; surface construction programme is nearing completion, and information contained in the annual report supports the contention of the parent company that St. Helena has every chance of becoming a successful gold producer.

Geduld Proprietary's Dual Income

Once again the Geduld Proprietary received a larger income last year from its investments than resulted from its milling operations. Developments were spread and a larger footage was accomplished though the pay percentage tapered and another disappointment was a drop in ore reserves.

Tonnage milled of 1,259,000 went against 1,279,000, yield being 2.93 dwt. per ton against 3.05 dwt. and the revenue per ton was 3d. lower at 38s. 4d. Costs rose by 10d. per ton to 27s. 10d. and the profit per ton milled dropped by 1s. 1d. to 10s. 6d. Working profit came out at £658,396 against £742,186 while income from investments was £772,833 compared with £824,896 the previous year. The two main sources for this revenue are shareholdings in Grootvlei and East Geduld and the latter, last year, distributed a smaller amount. Geduld Proprietary itself paid dividends of 14s. 9d. per share against 16s. 6d., which absorbed £1,077,382 and left an unappropriated balance of £387,440.

The development footage of 17,485 ft. increased by 1,317 ft. as a result of more work done on the Black Reef, although most of the footage was on the Main Reef, which accounts for 83 per cent of the ore reserves. These now amount to 3,500,000 tons—a drop of 500,000 since the previous computation, but the value is the same 3.40 dwt. over 51 in. Of the 12,955 ft. sampled last year, only 14 per cent (against 16 per cent) proved payable giving a value of 215 in.-dwt. Diamond drilling from the Black Reef workings to explore the Kimberley Reef horizon has commenced but insufficient work has been done to permit any estimate of the potentialities of the reef.

The Electricity Supply Commission has been unable to supply the industry with full power requirements and in order to meet the shortfall has given permission for Sunday milling. As Geduld commenced operations prior to the regulation prohibiting Sunday milling, no relief has been obtained from this concession but reorganization of mill maintenance work has helped to overcome the effects of power shortage.

East Geduld's Higher Profit

Although East Geduld's working profit last year was over £100,000 higher than in 1950, taxation more than absorbed the extra amount; it called for £2,522,275 (against £2,330,350) out of the profit of £4,604,113. Income from investments (537,600 stock units in Grootvlei Proprietary) brought in £82,557 against £83,586. Consistency of mill throughput was a marked feature; it amounted to 1,738,000 tons (exactly the same as the previous year). Yield was 6.0 (5.99) dwt. and revenue per ton 78s. 5d. compared with 76s. Working costs rose by 1s. 3d. to 25s. 5d. but not sufficient to compromise the profit per ton which went up to 53s. against 51s. 10d. the previous year. The company was obliged to scale down slightly the amount paid to shareholders which was 4s. 4d. per 4s. unit of stock as against 4s. 7½d.

Both Main and Kimberley development footage was lower and amounted to 13,322 ft. No payable values were disclosed on the Kimberley while of the 7,195 ft. sampled of the Main reef, the pay ratio dropped to 48 per cent (against 65) and the value to 188 in.-dwt. (284). A decrease of 100,000 tons in ore reserves, still leaves the total at the substantial figure of 12,400,000 tons with a value the same as previously, 5.7 dwt. over 51 in. The 1A Sub-Vertical Shaft had reached a depth of 537 ft. below collar by the end of the year.

The mine has suffered from a shortage of Native labour; supplies of iron, steel and cement have been insufficient and the Electricity Supply Commission has been unable to supply the Industry with its full power requirements. The shortfall in this during the week days has been made up by Sunday working. The mine being one of the "newer" undertakings has benefited by the relaxation in Sunday working restriction.

Grootvlei's Tonnage and Profit Record

As a gold producer, the Grootvlei Proprietary is not only the best of the Union Corporation group but one of the finest mines in the world. It added lustre to its record last year by dealing with the largest tonnage and announcing the highest profit yet made.

The mill crushed 2,338,500 tons, and although the average yield, 4.45 dwt. was a trifle below that of the previous year, revenue rose by 5d. per ton. This was due to increased sales of gold at enhanced prices for artistic and industrial purposes. Working costs showed an increase of 10d. per ton milled to 25s. and as a result, the working profit was lower by 5d. per ton at 33s. 1d. Working profit came out at £3,871,900 compared with £3,800,115 the previous year.

Total development decreased by 2,508 ft. to 58,027 ft., but the footage on the reef was slightly higher and the values disclosed showed little change. Of the 42,810 ft. sampled, 51 (against 55) per cent was payable, of a value of 222 in.-dwt. A further 500,000 tons of ore was added to the reserves due to an increase in the estimated stope width, and they now stand at 15,500,000 tons, value 4.7 dwt. These constitute the biggest aggregation of all the mines of the Rand.

Work in connection with an improvement in ventilation underground has gone ahead; fans have been installed at No. 5 shaft while construction work at No. 6 shaft is in progress to provide separate upcast and downcast ventilation. A sand plant is being erected to produce sand by crushing waste dump rock, and it will be used for sandfilling underground workings on both Grootvlei and the neighbouring East Geduld mines.

In consequence of the inability of the Electricity Supply Commission to supply full power requirements, the Government Mining Engineer sanctioned Sunday milling and hoisting to meet the shortfall.

Van Dyk's Southern Mining Section

Considering the phase in which the Van Dyk Consolidated is working, operations for 1951, as set out in the annual report, can be regarded as satisfactory. The future prospects of the mine hinge on the southern section which is being opened up from the new No. 5 Sub-Vertical shaft which attained its final depth of 8,139 ft. below surface in April, 1950. Of the 51,487 ft. of development work carried out during the year, 21,549 ft. were

in the region of this new shaft area. Development on the 48th level disclosed large scale folding of the reef and at the end of the year the level had advanced 4,425 ft. in footwall. Geological indications were that it was then re-approaching the reef horizon, so that it is reasonable to expect that in the near future some interesting news will be forthcoming.

During the year 27,700 ft. were sampled, of which 28 per cent proved payable of 217 in.-dwt. Of this 4,480 ft. were from the No. 5 shaft section and the pay ratio was 21 per cent, value 180 in.-dwt. In the established part of the mine development was almost completely confined to the exploration of selected areas, but sufficient new ore was not opened up to maintain the reserves which are 100,000 tons down at 1,700,000 tons of 3.6 dwt.

The mill dealt with 7,000 tons more at 1,204,000 of 3.02 dwt. ore. Revenue was 1s. 7d. up at 39s. 5d. but costs increased by 2s. 11d. to 35s. 1d. and profit per ton tapered to 4s. 4d. against 5s. 8d. After deducting costs and adding sundry revenue, there was a balance of £262,686. Capital expenditure on shafts, equipment, etc., called for £174,367. Taxation nominal, £8. No dividend was paid and there was an unappropriated balance of £71,460.

Marievale's Record Figures

Although record figures were, once again, achieved by Marievale Consolidated during 1951, the greater portion of the increase in working revenue was absorbed by costs. This member of the Union Corporation group dealt with the largest amount of ore yet put through the mill—729,000 tons—an increase of 3,500 tons; grade 4.97 dwt. went against 5.03 dwt. The total working revenue of £2,364,979 and per ton milled of 64s. 10d., were the best so far, while for the first time in the twelve years milling, working profit topped the million pound mark—£1,009,055. Government taxation and share of profit called for a greater proportion of the working revenue and the net profit was £32,660 lower at £512,140. Howbeit, the dividend was stepped up to 2s. per share against 1s. 10d. and called for £450,000. As on so many mines, working costs trended upwards and at 37s. 2d. per ton, were 9d. higher than in 1950. Profit per ton milled was 27s. 8d. against 27s. 2d.

Both the Main and Kimberley reefs are being worked and development disclosures in both showed an improvement in value and percentage payability. A total of 32,175 ft. were driven and of the 13,365 ft. of Main Reef sampled, 49 per cent (against 43 per cent) proved payable, while value was also higher—258 compared with 208 in.-dwt. The pay ratio of the Kimberley was also better—39 per cent of the 6,320 ft. sampled, which was just over 3,000 ft. less than in the previous year when payability was only 25 per cent. Value of 276 in.-dwt. went against 253 in 1950. Underground exploration of the Kimberley Reef horizon continued during the year and the ore reserve tonnage on this reef increased to 290,000 tons, averaging 5.7 dwt. Total reserves figure at 3,200,000 tons or 200,000 tons more than the previous computation, value being a shade lower at 5.5 dwt.

Vereeniging Estates Strong Investment Portfolio

Vereeniging Estates Investments are comprised principally of its holdings in its subsidiary companies, Amalgamated Collieries of South Africa. The Coronation Collieries, Springbok Colliery, Vereeniging Brick and Tile and The Transvaal Coal Corporation. The company also owns substantial holdings in African Metals Corporation.The Union Steel Corporation (South Africa), Vereeniging Consolidated Mills, Vanderbijl Engineering Corporation, South African Coal Estates (Witbank), and a direct interest in the Orange Free State Gold Fields through its substantial holdings in Welkom Gold and in the two Presidents, Brand and Steyn. The book cost of these investments as at December 31, 1951, was shown in the balance sheet at £7,724,693 (£5,877,790), the market value at the same date being £15,098,465, compared with £11,490,342.

Year to Dec. 31	*Gross Revenue*	*Taxation*	*Net Profit*	*To Reserve*	*Dividend*	*Carry Forward*
	£	£	£	£	%	£
1950	703,551	30,000	637,490	150,000	25	96,375
1951	800,858	36,000	726,736	50,000	25	104,294

The profit and loss account for the year ended December 31, 1951 showed a sharp advance in receipts from dividends, interest, rent and townships from £703,551 to £800,858. Expenses in South Africa and London were much the same as in the previous year, £38,122 against £36,061, taxation was moderately heavier, but net profit showed an advantage of £89,246 over the previous year's earnings. Expenses, including underwriting commission, in connection with the increase in the company's authorized capital by £500,000 to £3,000,000 and subsequently its issued capital by £500,000 to £2,750,000, totalled £34,902. An amount of £50,000 (£150,000), was allocated to general reserve, the dividend distribution of 25 per cent (same), required £637,500 (£562,500), leaving the carry forward at £104,294 compared with £96,375 previously.

—Vereeniging Brick and Tile's Record Earnings

This subsidiary company has now published its report and accounts for the calendar year 1951 and reveals record earnings before tax of £334,949 compared with £251,041 during 1950.

Year to Dec. 31	*Gross Revenue*	*Taxation*	*Net Profit*	*To Reserve*	*Dividend*	*Carry Forward*
	£	£	£	£	%	£
1950	313,300	57,000	194,041	50,000	17½	54,237
1951	397,576	94,858	240,091	50,000	22½	53,703

The company experienced a steady rise in demand for its products throughout the year and its subsidiary company, Vereeniging Tiles, in which it holds 51 per cent of the issued capital, also enjoyed a successful year, returning a net profit of £40,422 compared with an operating loss of £1,249 in 1950.

Dividends on the 500,000 5½ per cent cumulative non-redeemable preference shares of £1 each, fully paid, were maintained at 5½ per cent, but payment on the £1,000,000 issued capital in 5s. shares was stepped up from 17½ per cent to 22½ per cent.

Mr. T. Coulter is chairman of both companies and his annual statements giving details of the two companies' operations during 1951 appear on page 327 and page 328.

Company Shorts

Finance Bill Now Published.—The Finance Bill, published as we go to Press, and too late for us to do more than register the fact, will be fully discussed in our next week's issue.

Coal Shortage Curtails Copper Production at Mufulira.—Shortage of coal has adversely affected copper production at Mufulira Copper Mines during the current quarter, states an announcement released by the company earlier this week. The effects of the shortage have been aggravated by threat of damage to the railway bridge over the Kafue River resulting from serious flooding following abnormal rainfall. So long as this threat continues, the announcement adds, it is necessary, particularly in view of the company's heavy pumping load, to hold back part of the coal delivered as a reserve for use in maintaining essential services should the railway connection be broken.

While it is expected that part of the deficit will be made good during the June quarter by the smelting of accumulated concentrates, the company's output of blister copper for the March quarter will be considerably below normal and costs will be correspondingly affected.

Offer for Assets of Mazapil Copper.—It has been announced in a letter to stockholders of the Mazapil Copper Co. that the directors have been approached by a responsible and substantial company with a view to the grant of an option to purchase, for cash, the assets of Mazapil and its subsidiaries.

Negotiations, the letter states, have already been in progress for several weeks and, while a satisfactory outcome is neither certain, nor if it materializes, likely to be achieved for some weeks, the directors felt that stockholders should hear of these negotiations from the company and not by way of rumour.

Mazapil's objective in these negotiations would provide for a purchase price, payable in the event of the option being exercised, in excess of the recent market value taken at 25s. per £1 unit.

It is emphasized in the letter that agreement has not yet been reached on the terms of the proposed option and that, if and when agreement is reached, Treasury consent will still have to be obtained. In the event of negotiations reaching this stage, full particulars will be circulated to stockholders and an extraordinary meeting called.

Konongo Gold Mines Maintain Dividends.—Konongo Gold Mines is recommending the payment of a dividend of 10 per cent (same), equivalent to 2.4d. per share for the year ended September 30 last.

Net profit for the year, after providing £15,272 (£16,800) for depreciation and £104,000 (£104,500) for taxation, amounted to £51,987 compared with £69,211 previously. The sum of £20,000 (£30,000) was transferred to general reserve, the dividend payment absorbed a net amount of £32,511 (same), and the carry forward at the fiscal year end amounted to £60,855 against £61,379 brought in.

Yukon Consolidated: Provisional Results for 1951.—Provisional figures for 1951 (subject to audit) announced by Yukon Consolidated Gold Corporation, which is incorporated in Canada, disclosed that net profit for the year, after providing for all charges including $C.250,000 for depreciation and amortization (no income tax was payable), amounted to $C.603,100 compared with $C.829,695 in 1950.

The above figures are exclusive of the amount received under the Canadian Emergency Gold Mining Assistance Act which for 1950 amounted to $C.43,435; the estimated amount for 1951 is expected to be $C.125,000 but no precise figure can be given until the figures for the year have been audited and approved by the Canadian Treasury.

A dividend of 10c. per share requiring a total of $C.595,171 was paid at the end of October last from the accumulated surplus as at the end of 1950. Liquid resources at the 1951 year-end (exclusive of any amount received from Government aid) were approximately $C.1,814,000.

Rhodesia-Katanga Reports Small Loss.—After providing for all charges, including £208 for taxation, Rhodesia-Katanga during the year ended December 31, 1951, showed a loss of £2,425 compared with a profit of £87 in the preceding year. The preliminary statement giving these results also reported that the debit balance carried forward at the fiscal year-end was £255,048 against £252,623. Sir J. U. F. C. Alexander is chairman. The annual meeting will be held on May 7.

General Tin Investments.—Gross income from investments of £295,183 (£251,697) was the chief item comprising the gross revenue of General Tin Investments during the calendar year 1951 amounting to £295,623 against £252,050. After providing for all expenses, including taxation liabilities of £128,189 (£112,216), net profit was £145,539 compared with £132,987 in the preceding year. Two interim dividends totalling 9 per cent required £102,060, the sum of £59,508 (nil) was allocated to investment reserve leaving the carry forward lower at £39,806 compared with £53,069 brought in.

Malayan Tin Bureau.—Malayan tin producers have announced the opening of an office in the U.S. to provide accurate information on tin production and marketing. The new information centre will operate under the name of The Malayan Tin Bureau and will be located at 1028, Connecticut Avenue, Washington 6, D.C.

The establishment of this bureau, the announcement states, reflects the mutual and vital interests of Malaya and the U.S. in this strategic metal. Mr. Lynn W. Meekins will be the director of the bureau.

This decision on the part of the Malayan Tin Producers is welcome news indeed for it should avoid any recurrence of the charges made in the U.S.A. against Malayan Tin Producers last year that they were "gouging" the U.S.A. by holding up the price of tin.

Bulolo Joint Plywood Undertaking Agreed.—Bulolo Gold Dredging has announced that all outstanding points in connection with the proposed joint Commonwealth-Bulolo plywood undertaking have been agreed with the Australian Minister of Territories.

Bulolo will convene shortly an extraordinary meeting to consider this undertaking.

Indian Copper Dividends.—In a circular letter to stockholders of Indian Copper Corporation who are not on the Indian Register, the company advises these stockholders to open a current account with a bank in India. In the event of no instructions being lodged with the company future dividends, the circular states, will be remitted by post by rupee warrant payable in Calcutta.

The foregoing arises from the transfer of the seat of control of the corporation to India, unanimously agreed upon at the extraordinary meeting held in London on March 26.

Ashanti-Adowsena Winding-Up.—On the petition of the United Africa Co., an order was made in the Chancery Division at the beginning of this week for the compulsory winding-up of Ashanti-Adowsena (Banket) Goldfields.

On behalf of the petitioners it was said that they were creditors for £1,200 and in this they were supported by Imperial Chemical Industries who were creditors for £700. The petition was not opposed and on behalf of the company it was said that the order could not be resisted.

Bushtick Closes Killarney Mine.—Bushtick Mines (1934) have announced that, on the advice of the consulting engineers, the directors have decided to cease operations on the Killarney Mine immediately and will make every endeavour to dispose of the mine.

Kenya Consolidated to Wind Up.—Kenya Consolidated Goldfields convened an extraordinary general meeting on March 18 last in Kisumu, Kenya Colony, to consider a resolution placing the company in voluntary liquidation.

Sub Nigel.—Sub Nigel has notified holders of share warrants to bearer that as from April 1 next, sheets of coupons, Nos. 56 to 76 with Talon No. 2 attached and also Nos. 77 to 96 with Talon No. 3 attached, will be exchangeable at the London office, 49, Moorgate, E.C.2, instead of at the standard Bank of South Africa, 63, London Wall, E.C.2. Lloyds, and The National Provincial Foreign Bank, 43, Boulevard des Capucines, Paris, will continue to act for the company for the convenience of Continental holders.

Brigadier E. H. L. Beddington has joined the board of Puket Tin Dredging.

Mr. A. V. Conrad has been appointed a director of San Francisco Mines of Mexico.

Mr. W. H. Harrison-Cripps has joined the board of the Bolivian and General Tin Trust.

Mr. Robert Foot has resigned his seat on the board of Powell Duffryn, in consequence of his departure to take up permanent residence as executive chairman of Wankie Colliery in Southern Rhodesia. He will, however, retain his association with Powell Duffryn through his appointment to the chairmanship of the Powell Duffryn subsidiary company, Powell Duffryn (Rhodesia), recently registered in Salisbury.

Mr. A. King is leaving the board of Tanganyika Central Gold Mines.

Mr. F. R. Peters has been elected a director of Nigerian Consolidated Mines.

Mr. Cornelius James Robson has been appointed to the board of New Kleinfontein and **Mr. Andrew King** has resigned.

The death is announced of **Mr. I. Shaffer,** chairman and managing director of Merchants Industrial Corporation and chairman of New Union Goldfields, who was killed on March 22 last when the aircraft in which he was travelling crashed near Frankfurt. Mr. Shaffer was appointed to the board of New Union Goldfields last year after the company had secured its release from judicial management through the provision of fresh funds by Merchants Industrial Corporation.

Mr. E. D. Shearn has joined the board of Kramat Pulai.

Mr. G. C. Wishart has been elected a director of Northern African Mining and Finance.

Mr. G. V. White has been appointed a director of Union and Rhodesian Mining and Finance.

Mr. W. D. Wilson has been appointed a director of Orange Free State Investment Trust and Mr. L. Marks has resigned.

DIVIDENDS

Ashanti Goldfields 25% (May 22)
African & European Investment Ord. 2s. 6d.
Ampat Tin Dredging 15% *i* (April 3)
Anglo American Corporation of South Africa 4s. (May 19)
Anglo-French Exploration 7½%
Ayer Hitam Tin 25% *i* (April 16)
Bibiani 12½% (May 22)
Consolidated Mines Selection 25%
Central South African Lands & Mines Pref. 5½% (April 1)
James Howden 7½% *i*
Kent (F.M.S.) Tin 25% *i* (April 10)
Konongo Gold Mines 10%
Lyndhurst Deep Level (Gold and Silver) 15% (May 15)
Missina (Transvaal) Development 7s. 6d. (April 29)
North Kalgurli (1912) 6d. *i* (April 30)
Rambutan 2½% *i* (April 8)
Rambutan 2½% *i* (April 8)
Tanjong Tin Dredging 25% *i*, (April 10)
Union Corporation 36%*

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THE VEREENIGING ESTATES, LTD.

(Incorporated in the Union of South Africa)

INCREASED REVENUE

MR. T. COULTER'S STATEMENT

The Fifty-Third Annual General Meeting of The Vereeniging Estates Ltd. will be held in Johannesburg on May 2.

The following is an extract from a statement by the Chairman, **Mr. T. Coulter,** dated March 11, 1952, circulated with the annual report and accounts for the year ended December 31, 1951:

The revenue for the year amounted to £800,858, compared with £703,551 for the year 1950. Expenses including directors' fees, salaries and depreciation amounted to £38,122, leaving a net profit carried to appropriation account of £762,736, which was £95,246 higher than the net profit for the previous year. There has to be added the surplus arising from the realization of investments and other fixed assets amounting to £3,585, referred to in some detail in the directors' report and an amount of £96,375 brought forward from the previous year, giving a total sum of £862,696 to be dealt with. Provision for taxation absorbed £36,000 and £34,902 has been utilized in writing off the capital increase expenses, while £50,000 has been transferred to general reserve account. An interim dividend of 10 per cent was paid during August of the year under review and a final dividend for the year of 15 per cent has recently been declared. These appropriations accounted for £758,402, leaving a balance on appropriation account of £104,294, which has been carried forward to the current year.

Dividend declarations for the year totalled 25 per cent, and were unchanged from the previous year, but as the final dividend was declared on the higher issued capital, the amount distributed has increased by £75,000.

The authorized capital of the company was increased during the year by £500,000 to £3,000,000, in terms of a special resolution passed on August 27, 1951. Thereafter, the issued capital was also increased by £500,000, and now stands at £2,750,000. The premium on the issue of 500,000 shares amounted to £2,100,000, and share premium account has increased by that amount to £4,069,959.

COLLIERY INTERESTS

During the year 1951 the coal industry experienced considerable difficulties due to shortage of railway transport, in consequence of which the output of coal was seriously affected. Towards the middle of the year the position became so bad that a crisis developed, and it became necessary to utilize all available truckage to maintain even minimum supplies for the inland market. This crisis resulted in the Transvaal producers having to sacrifice their overseas markets, and for the past eight months little or no coal has been exported. The loss of this profitable market, which has been subsidizing inland prices for some years past, was a serious blow to the industry, and some months elapsed before the Price Control authorities could be persuaded that an increase in the price of inland coal was justified. The position at the moment is that the industry has been permitted partially to adjust prices in the inland market, and it is confidently hoped that in the very near future the process of adjustment will be completed, thus enabling the collieries to operate on their normal profit-earning basis without having to rely on the subsidizing benefits of export business.

As regards the outlook for export trade it is also hoped that present restrictions of transport are only a temporary phase and that in the near future the railway administration will see its way clear to provide the necessary transport which will enable the Transvaal industry to resume the export of coal for which the demand in many overseas markets remains at a high level.

In this connection it is necessary to point out that approximately 60 per cent of the output produced by the various collieries in which your company owns substantial holdings is supplied direct to power stations owned by Electricity Supply Commission, and is not dependent on transport by the South African railways. Consequently, these collieries are not affected to the same extent by shortage of transport as are many others whose entire output is handled by the railway administration.

AMALGAMATED COLLIERIES OF SOUTH AFRICA LTD.

The sales output of this company, comprising the outputs of directly operated collieries and of wholly owned subsidiaries amounted to 7,093,654 tons being an increase of 302,906 tons over the output for the previous year. The increase is directly attributed to the opening up of new collieries and the output would have been considerably enhanced but for the transport difficulties already referred to. Dividends declared during the year 1951 were unchanged at 15 per cent.

THE CORONATION COLLIERIES LTD.

The sales output of this company for the year under review was 1,072,003 tons being a decrease of 116,907 tons when compared with the previous year. Here again this decrease was due entirely to shortage of railway transport, and not to any falling off in the demand for coal. The sales output of its subsidiary, Vryheid Coronation Ltd., was 580,312 tons of coal and 157,342 tons of coke, both outputs being lower than 1950 when 620,581 tons of coal and 164,499 tons of coke were produced. Dividends declared during the year 1951 were unchanged at 27½ per cent.

SPRINGBOK COLLIERY LTD.

This company sold 872,338 tons of coal during the year, which was 29,288 tons less than the output for the previous year. Dividends declared during the year 1951 were unchanged at 30 per cent.

SOUTH AFRICAN COAL ESTATES (WITBANK) LTD.

The sales output of this company, in which your company has a substantial interest, was 1,750,159 tons, compared with 2,104,614 tons for the previous year. The financial year of this company closes on June 30, 1952, and the dividends declared for the year ended June 30, 1951, totalled 20 per cent, being the same as for the previous year. Your company's accounts include the final dividend declared in June, 1951, and the interim dividend declared in December, 1951.

VEREENIGING BRICK & TILE CO. LTD.

This subsidiary company earned the record profit during the year under review of £334,949, compared with £251,041 during 1950. Preference share dividends were maintained at 5½ per cent and Ordinary share dividends improved from 17½ per cent to 22½ per cent. There was a steady rising demand for the company's products throughout the year, and all departments contributed to the increased profits achieved.

Copies of the Annual Report and Accounts may be obtained at the London office of the company, 11, Old Jewry, E.C.2.

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TRACTORS

D.2 Caterpillar Tractors, Model 3J. Several machines in unused condition and reconditioned before delivery.

Aveling-Barford Calf dozer Model CD.2. Completely reconditioned. Driven by Hopper cooled petrol engine.

T.D.9 International with Ruston-Bucyrus Hydraulic Ang'e-dozer. Completely reconditioned.

AIR COMPRESSORS

Diesel driven sets by Consolidated type P.O.2/125 with Ruston 3 VRO engines. Air receiver, fuel tank. On two wheel pneumatic trailers.

PNEUMATIC TOOLS

C.P.4 high lift sump pumps with delivery hose. Pile driver attachments for Ingersoll-Rand breakers. Rock drills by Climax, Holman & Consolidated. Boyer Longstroke rivet hammers and C.P. metal drills. Breaker steels and air hoses.

VEREENIGING BRICK & TILE CO. LTD.

(Incorporated in the Union of South Africa)

RECORD RESULTS

BENEFIT OF EXPANSION AND MODERNIZATION SCHEMES

The Sixth Annual General Meeting of Vereeniging Brick and Tile Company, Ltd., will be held in Johannesburg on May 2.

The following is an extract from a statement by the Chairman, **Mr. T. Coulter,** dated March 11, 1952, circulated with the annual report and accounts for the year ended December 31, 1951: The profit from trading, after providing for all working costs and administration charges, was £396,796, an increase of £83,496 when compared with the previous year. Directors' fees, contributions to staff pension fund, provision for depreciation, interest and donations absorbed £62,627, and after adding £780 for sundry revenue received there was a net profit for the year of £334,949, as against £251,041 for 1950. Provision for taxation was £94,858 and £50,000 has been transferred to general reserve account, which now stands at £200,000. Preference dividends absorbed £27,500 and Ordinary dividends totalled £163,125. The Ordinary distribution improved from 17½ per cent declared in 1950 to 22½ per cent. The balance on appropriation account carried forward to the current year was £53,703, compared with £54,237 brought forward at the beginning of the year.

OPERATIONS

The demand for the varied range of the company's products of refractory brick and specials, salt-glazed ware and building brick has remained steady throughout the year. Production in all departments of the works has increased, and the record profits already referred to are directly attributable to the expansion and modernization schemes that have been introduced during the past few years.

VEREENIGING TILES LTD.

The issued capital of this subsidiary company, which manufactures concrete roofing tiles, was £60,000 at the end of the year of which your company had subscribed 51 per cent and Redland Tiles Ltd., of Surrey, England, the remaining 49 per cent. The venture had a very successful year, returning a net profit of £40,422, and there was a balance on appropriation account after providing for private companies' levy and writing off the debit balance on profit and loss account brought forward, of £28,659. No dividends were declared pending the outcome of investigations into the advisability of extending the activities of the company. The temporary loan account, which had been provided by your company, and which stood at £24,500 at the end of 1950, was completely repaid during the year.

The demand for this company's roofing tiles has been steadily increasing and, as your directors are reasonably satisfied that the demand, which at present exceeds the capacity of the plant, will continue, it has been decided that a second works, capable of doubling the output, should be established.

RHODESIAN REFRACTORIES LTD.

I referred in my statement accompanying the accounts for 1950 to the proposed formation, jointly with The Consolidated Rand Brick, Pottery and Lime Company, Ltd., of a company in Southern Rhodesia to supply magnesite sinter for Union consumption and to manufacture certain lines of refractory bricks for the Rhodesian and Congo markets. Rhodesian Refractories Ltd., was duly formed during the year and at December 31, 1951, its issued capital stood at £120,000, of which £72,000 was subscribed by your company and £48,000 by The Consolidated Rand Brick, Pottery and Lime Company, Ltd. The activities of this company for the year under review have been confined to the supply of raw magnesite to the two participants and work has commenced on the erection of the sinter plant. In terms of the formation agreement, your company's magnesite quarries at Gatooma, Southern Rhodesia, were sold to the new company at the original cost price.

EXPANSION PLANS AND FINANCE

The demand for the company's products, particularly in the extensive variety of refractory brick, continues to increase with the growth of the iron and steel and allied industries and with the industrial development in South Africa generally. In order to keep pace with the demand it is imperative to increase the production capacity in a number of the manufacturing departments. Estimates have been prepared of the funds that will be required over the next two years to finance the new expansion schemes and to repay loans made by The Vereeniging Estates Ltd. The sum required is of the order of £525,000 and shareholders have already been acquainted with the proposal to increase the authorized capital to £1,750,000, and to raise the money required by the issue of 2,100,000 Ordinary shares at par to existing shareholders in the ratio of 18 new shares for every 25 held.

Copies of the annual report and accounts may be obtained at the London Office of the Company, 11, Old Jewry, E.C.2.

ANGLO AMERICAN CORPORATION OF SOUTH AFRICA, LIMITED

(Incorporated in the Union of South Africa)

ORDINARY DIVIDEND No. 31

NOTICE IS HEREBY GIVEN that a final Dividend (No. 31) of 4s. per share has been declared for the year ended December 31, 1951, payable to shareholders registered in the books of the Corporation at the close of business on April 15, 1952, and to persons presenting Coupon No. 33 from Share Warrants to Bearer. This dividend together with the interim dividend declared on September 27, 1951, makes a total of 6s. per share for the year.

The dividend is declared in the currency of the Union of South Africa and becomes due on April 16, 1952. Warrants will be posted from the Head and London Offices on or about May 19, 1952.

The dividend is payable subject to the usual conditions, which can be inspected at the Head and London Offices of the Corporation.

The Transfer Books and Register of Members will be closed from April 16, 1952, to April 24, 1952, both days inclusive.

Holders of Share Warrants to Bearer are notified that the dividend is payable at Barclays Bank (Dominion, Colonial and Overseas), Circus Place, London Wall, London, E.C.2, or at the Banque de l'Union Parisienne, 6 and 8, Boulevard Haussmann, Paris, on or about May 20, 1952. Coupons must be left four clear days for examination.

The effective rate of Non-Resident Shareholders' Tax is 6.075 per cent.

The profit for the year, after providing for taxation, is £2,894,000 (previous year £2,340,000).

An amount of £850,000 (previous year £3,050,000, which represented share premium less expenses of new issues) has been placed to General Reserve, which now stands at £13,500,000.

By Order of the Board,
W. E. GROVES,
London Secretary.

London Office:
11, Old Jewry, E.C.2.
March 26, 1952.

REQUIRED FOR
BOLIVIAN TIN—TUNGSTEN—SILVER—COPPER—
PRODUCERS OPERATING AT 12/16,500 FEET

METALLURGIST MILL FOREMAN: University Graduate or equivalent first-class qualifications. Experienced ore dresser and mill operator. Standard three year contract. Salary $5,000 U.S. Cy. yearly, plus bonus one month's salary yearly. Single status, or if married, single status for six months. Working knowledge Spanish essential. Free transportation to Bolivia by air for employee (and wife, if married). Four weeks' vacation yearly. Free living quarters.

JUNIOR METALLURGIST: College graduate in ore dressing. Some experience ore dressing laboratory test work. Standard three year contract. Salary $3,600 U.S. Cy. yearly, plus bonus one month's salary yearly. Single. Knowledge Spanish desirable. Free transportation to Bolivia by air. Four weeks' vacation yearly. Free living quarters.

JUNIOR MINE ENGINEER: Recent College Graduate, with underground surveying and draughtsmanship experience. Single man only. Standard three year contract. Salary $3,300 U.S. Cy. per annum, plus bonus 1 month's salary yearly. Four week's vacation yearly. Free transportation to Bolivia by air. Free living quarters.

Application by letter only, with copies of first-class references to MINING & CHEMICAL PRODUCTS LTD., Manfield House, 376, Strand, London, W.C.2.

SITUATIONS VACANT ADVERTISED ABOVE.—*The Notification of Vacancies Order, 1952, must be complied with where applicable.*

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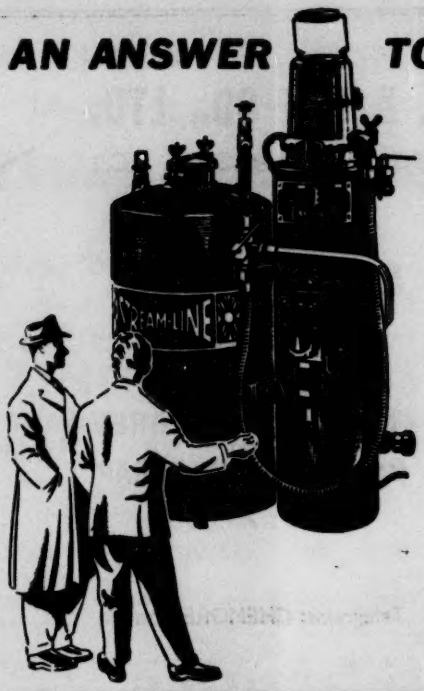

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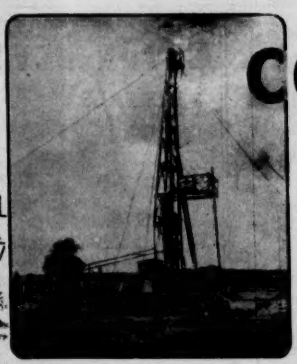

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